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MASS EMISSIONS FROM TEN PRE-CONTROLLED GASOLINE TRUCKS, AND COMPARISONS BETWEEN DIFFERENT TRUCKS ON A ROAD COURSE

M. N. Ingalls, et al

Southwest Research Institute

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Exhaust emission and fuel economy tests were performed on ten 1965-1969 pre-emission-controlled gasoline-powered heavy-duty trucks while being operated over the San Antonio Road Route (SARR). Each vehicle was also emission tested using a 9-mode chassis dynamometer test procedure. Comparisons were made on emission data between these two test procedures as well as emission data and fuel-economy data from two other heavy-duty testing projects, also conducted by SwRI:

Contract EHS 70-113, Part 1 : 25 1970-1972 emission-controlled gasoline-powered Heavy-Duty trucks.

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Mobile Source Air Pollution Control
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EPA Project Officer: Gordon J. Kennedy

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Publication No. EPA-460/3-75-004

ABSTRACT

This report describes the emissions, fuel economy and selected performance results from a group of ten pre-controlled (pre-1970) gasoline powered trucks above 6000 lbs gross vehicle weight. Each vehicle was operated three times each by three drivers over the San Antonio Road Route, a 7.24 mile course that includes a variety of driving conditions. Emissions of hydrocarbons, carbon monoxide and oxides of nitrogen were acquired using a constant volume sampler and expressed in grams per test, grams per minute, grams per mile and grams per lb of fuel burned. Vehicle speed, engine speed, and intake manifold vacuum were recorded throughout the nominal 20 minute run and expressed as percent of time in a given interval of mph, rpm or in. Hg vac. Laboratory tests of these same trucks were made using a chassis dynamometer version of the nine-mode Federal Test Procedure with expression in both concentration and grams/lb fuel using a CVS.

Also included in this report is a summary compilation and limited comparison/analysis of results from this study with a group of 25 post-1970 (emission controlled) and ten diesel powered trucks. These trucks were evaluated in previous projects of a similar nature. In addition to the usual methods of expression, emissions were computed in terms of grams per ton-mile and fuel economy in terms of ton-miles per gallon. Ton-Miles is considered a more appropriate means of expression in that it includes the social value of the heavy duty truck.

FOREWORD

This project was conducted for the U. S. Environmental Protection Agency by the Department of Emissions Research of Southwest Research Institute. The field and laboratory testing phase of the project began in July 1974 and was completed in December 1974. This is the fourth project involving operation of heavy duty trucks over the San Antonio Road Route. The first project, under Contract PH 86-67-72, tested six pre-1970 gasoline powered trucks. The second project, conducted under Contract EHS 70-113 tested 25 gasoline powered trucks of model year 1970 to 1972. The third project conducted under Contract 68-01-2113, tested 10 diesel-powered trucks of model years 1970 to 1973. This project was conducted under Contract 68-03-0441 and identified within Southwest Research Institute as project 11-3975-001.

The EPA Project Officer for this project was Mr. Gordon Kennedy of the Certification and Surveillance Division, Office of Mobile Source Air Pollution Control, EPA, Ann Arbor, Michigan. Mr. Karl J. Springer, Director, Department of Emissions Research at SwRI served as Project Manager. The project was under the supervision of Mr. Melvin N. Ingalls as Project Leader. The SwRI personnel who performed most of the test work included: Robert Howard, lead technician, John T. Jack, Ernest Krueger, and Joyce Winfield, technicians.

Three project reviews by the EPA Project Officer occurred during the test and analysis phase of this project. The first occurred on June 4, 1974 when the EPA Project Officer, Mr. Gordon Kennedy, visited the Department of Emissions Research at SwRI, prior to commencement of actual testing. The instrumentation to be used was inspected and the test plan was discussed. The second review occurred on August 1, 1974 when Mr. Gordon Kennedy and Mr. Fred Dindoffer, also from the Certification and Surveillance Branch, EPA, Ann Arbor, visited SwRI to observe the testing of the second of the ten trucks evaluated. The third project review took place on October 9, 1974. Mr. Gordon Kennedy again visited SwRI to observe the testing of the ninth truck and to discuss the test results.

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SUMMARY

A group of ten 1965 to 1969 model year gasoline powered trucks (defined as precontrolled trucks) above 6000 lbs. GVW were operated on the road and on a chassis dynamometer to obtain mass rates of HC, CO and NO_x exhaust emissions. These mass emissions rates were obtained to aid in determining national impact of trucks classed as heavy duty. This report described the results and how these results were obtained from operation over both the San Antonio Road Route and in the laboratory using a chassis version of the nine-mode Federal Test Procedure. The ten-truck fleet, representing five manufacturers, was made up of in-service vehicles consisting of 8 single body trucks and 2 tractor-trailer combinations.

The road exhaust emissions were obtained using a constant volume sampler carried in the truck (or trailer in the case of tractor-trailer combinations) along with additional weight to equal the empty weight of the truck plus half the vehicle payload. Electric power for the CVS and other systems was supplied by a trailer-mounted 20kw engine-generator set towed behind the truck. Several runs were made over the road course for each truck with the CVS system sampling continuously over the 7.24 mile course. Several different drivers were used during these replicate tests.

To define how each truck operated over the road route, a continuous record of engine speed, vehicle speed, and intake manifold vacuum was obtained by strip chart recorder and magnetic tape. The magnetic tapes were computer reduced to indicate percent time at various increments of engine rpm, vehicle mph, and manifold vacuum.

The laboratory test performed on each truck was a chassis version of the nine-mode FTP. The CVS was also used during these tests to obtain a self-weighted, bagged exhaust sample.

The report presents the emission results from the road tests in terms of grams/min, grams/lb of fuel, grams/mile and grams/ton-mile. These results provide the necessary information for emission inventory and impact studies, when combined with truck population and usage data. There was significant truck-to-truck emission level variability. The maximum emission level of any truck was from 2 to 10 times the minimum emission level of the trucks depending on the emission type and method of expressing emissions. Some statistical analysis was performed to ascertain the relationship between road exhaust emissions and several engine/vehicle variables. While the sample size was too small to draw any definite conclusions, several possible relationships were identified. There is apparently an inverse relationship between CO in g/mile and NO_x in g/mile. Other possible relationships are between CO in grams/lb of fuel and both engine CID and vehicle test weight and between NO_x in g/mile

and both engine CID and vehicle test weight.

The chassis dynamometer nine-mode FTP results were obtained in volumetric concentrations and in g/lb of fuel. As would be expected from trucks manufactured before the 1970 heavy duty emission standards were effective, the HC and CO emissions from all but one of the trucks were above the 1970 standards. When the mass emissions were compared between the road and dynamometer tests, the average nine-mode HC emission level was 70 percent of the road HC level, the average CO level 89 percent of the road level, and the average nine-mode NO_x level 144 percent of the road NO_x level.

From the operational performance data taken during the road testing, the average vehicle speed was determined to be 20.4 mph and the average engine speed 1551 rpm. It was also determined that approximately 15 percent of time spent on the road route was at idle conditions. The average fuel economy was 5.56 miles per gallon.

Part II of this report is a summary compilation and limited comparison/analysis of results from this study with a group of 25 post-1970 (emission controlled) trucks and ten diesel trucks. These trucks were evaluated in previous projects of a similar nature. In addition to the usual methods of expression, emissions were computed in grams per ton-mile and fuel economy in ton-miles per gallon. Ton-miles is considered a more appropriate means of expression in that it includes the social value of the heavy duty truck.

The average mass HC and CO road emissions from the controlled gasoline powered trucks were lower, and the average NO_x road emissions level higher, than the same emissions from the precontrolled trucks. The average road HC, CO and NO_x emissions in grams/ton-mile of the diesel trucks were all lower than the same emissions from controlled gasoline powered trucks.

The operational performance data indicates that there is little difference in the way the diesel and gasoline powered trucks operated over the road route. The average diesel fuel economy in ton-miles/gallon, however, was over twice the fuel economy of the gasoline powered vehicles.

This compilation represents about 400 individual runs over the San Antonio Road Route and some 100 laboratory dynamometer tests. In addition to being helpful in determining the role of the heavy duty truck in national emissions inventory and impact, as a percent of total and mobile emissions, the data is considered quite useful in the investigation of alternative heavy duty test procedures.

INTRODUCTION

This is the fourth in a series of projects designed to investigate exhaust emissions from trucks in actual road operation. In this project ten pre-emission controlled trucks (Model years prior to 1970) were operated over a closed course through an urban-suburban area. The exhaust emissions in mass units and vehicle operational parameters were measured during operation over the course. One of the objectives of this study is to provide data on pre-controlled gasoline trucks that may be compared with the previously tested control equipped gasoline-powered trucks and 1970-73 diesel trucks. To facilitate comparison, a summary of the results from previous studies has been included in this project.

A. Report Organization

This report is in two parts, Part I describes the preparation and testing of the ten pre-emission controlled heavy duty trucks tested for the EPA under Contract 68-03-0441 and presents the results of these tests. Part II describes all the trucks tested over the San Antonio road route since 1971, presents the results of the tests, and compares the pre-controlled gasoline powered trucks, the emission controlled gasoline powered trucks, and the diesel powered trucks. The test preparations, instrumentation and procedures for all trucks tested were similar to those items presented in Part I of the report. Since the equipment and procedures used in the current study evolved from the previous projects, and the results of all the studies are compared in Part II of this report, a brief review of the previous road route emission investigations is in order.

B. Previous Projects

The first study of truck emissions from actual road operation was conducted in 1969 under EPA, then the National Air Pollution Control Administration (NAPCA), Contract PH 86-67-72. Road emissions were obtained from six gasoline powered 1966 to 1969 model year trucks. This was the first project to utilize the constant volume sampler (CVS) to obtain emissions during road operation. These results were compared to the Federal Test Procedure (FTP) for heavy duty gasoline trucks.

Engine rpm, manifold vacuum, throttle position and vehicle speed were also obtained from each test, using strip chart recorders. The results from this series of tests are presented in an interim report for Contract PH 86-67-72 entitled "Preliminary Studies of Emissions from Gasoline-Powered Vehicles Above 6,000-lb Gross Vehicle Weight," dated December 1969.

The first gasoline powered truck exhaust emission standards went into effect in 1970.(1)*. To determine the exhaust emissions from trucks designed to meet these standards, a second road study was initiated for the EPA under Contract EHS 70-113 in 1972. This study obtained road exhaust emissions from 25 1970-1972 model year trucks, utilizing the techniques developed in the previous project. This project also used a portable data acquisition system to record the engine and vehicle operational parameters on magnetic tape in digital form. The road results were compared to CVS results obtained during the laboratory tests using the nine-mode FTP. The results of this study are contained in Part 1 of the final report for Contract EHS 70-113 entitled "In-Use Heavy Duty Gasoline Truck Emissions (Part 1) - Mass Emissions from Trucks Operated Over a Road Course," dated February 1973 (EPA-460/3-73-002A).

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*Numbers in parentheses refer to references listed in List of References.

The third study obtained mass emissions and vehicle operational characteristics for ten diesel powered trucks above 6,000-lb GVW during operation over the San Antonio Road Route (SARR) and during a chassis version of the 13-mode 1974 Federal Test Procedure (FTP) gaseous emissions test. The project utilized the procedures developed in the previous projects to obtain CO and NO_x during road operation. To measure the diesel exhaust hydrocarbons (HC) during road testing, a heated flame ionization method was employed to continuously sample the dilute exhaust stream. Fuel rate, a good indicator of power output for a given diesel engine, was determined continuously during the road tests by means of a CO_2 NDIR measurement and conventional carbon balance calculations. The results of this study are presented in the final report for Contract 68-01-2113, entitled "Mass Emissions from Diesel Trucks Operated Over a Road Course", dated August 1974 (EPA-460/3-74-017).

C. Objective

The objective of this contract was to acquire emission and operational data from ten pre-emission controlled gasoline powered trucks above 6000-lb GVW. The ultimate objective was to compare the data from the ten pre-controlled trucks to data already acquired under Contract EHS 70-113 from 25 gasoline powered trucks built after the advent of the Federal emissions standards for trucks (1970 and later model years).

D. Approach

The approach to meeting the objective was similar to the approach used in the previous road studies. The ten precontrolled trucks from model years 1965 to 1969 were selected from operating fleets and tested over a closed road course which included urban and suburban traffic. A constant volume sampler (CVS) was used to obtain an integrated, bagged exhaust sample during operation over the road course. The HC, CO, and NO_x concentrations were obtained with the analytical instrument system used for light duty CVS testing. The emission concentrations were then converted to mass emissions by normal CVS data reduction procedures. The trucks were also tested on a chassis dynamometer version of the gasoline nine-mode FTP. The usual emission concentrations were obtained from these tests as well as CVS bag samples. The results from the road and chassis CVS tests were compared.

The vehicle operational parameters were measured continuously during the road operation by appropriate transducers and the values recorded on magnetic tape for analysis. The percentage of time spent at various increments of speed, engine rpm, and manifold vacuum was obtained from computer processing of the data tapes.

PART I

TESTS OF TEN PRECONTROLLED GASOLINE TRUCKS

This part of the report covers the testing and test results from the ten pre-emission controlled trucks tested under this project. The comparison of the results from this study with previous road tests is presented in Part II.

A. THE TEST FLEET

The ten truck test fleet was selected to duplicate as nearly as possible the make, model, engine displacement, GVW, etc., of 25 emission control equipped vehicles studied under Contract EHS 70-113. Exact duplication was not possible, particularly in engine model and displacement, since engine models found in pre-1970 vehicles were not necessarily used in post-1970 vehicles. Where exact matches were not possible, the popular engine models for the 1965 to 1969 model years were chosen.

The test fleet is described in Table 1. Figures 1 and 2 are pictures of the individual trucks comprising the test fleet. Eight of the ten trucks were single body trucks; two were tractor-semitrailer combinations. Of the single body trucks, six were vans, one was a stake truck, and one a dump truck. Five different manufacturers were represented by the ten different engine models tested. Seven of the engines were V8 models, two were I6 models and one was a V6. The GVW (or GCW) of the vehicles ranged from 10,000 pounds to 43,500 pounds. The test weight ranged from 9140 to 28,900 pounds. Of the ten trucks, two were from government operations, four from private fleet owners and four from leasing operators. Six of the single bodied trucks were used in local service, carrying goods or materials from one location to another. Two of the single body trucks (trucks G-7 and G-8) were used to haul goods between cities. One of the tractors (truck G-10) was used in local beverage delivery. The other tractor (truck G-9) was used as a gasoline hauler between two cities.

TABLE 1. DESCRIPTION OF PRECONTROLLED GASOLINE POWERED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

Truck No.	Model Year	Make	GVW lbs	Test Weight-lbs	Empty Wt.	Engine CID	Cyl.	Body Style	Trans-mission	Mileage
G-1	1967	Ford	17,000	12,400	7,800	330	V8	Van	4-std	84,256
G-2	1968	IHC	18,200	14,900	11,600	304	V8	Van	4-std	69,156
G-3	1967	Ford	10,000	9,140	8,280	300	I6	Van	Auto	57,686
G-4	1969	Chevy	18,000	13,475	8.950	350	V8	Van	4-std	38,795
G-5	1967	Dodge	19,500	13,875	8,250	318	V8	Stake	5-Hi-Lo*	39,005
G-6	1968	IHC	27,500	18,960	10,420	345	V8	Dump	5-Hi-Lo*	56,461
G-7	1965	Chevy	19,500	14,850	10,200	292	I6	Van	4-std	46,486
G-8	1965	GMC	19,500	15,970	12,440	351	V6	Van	5 Hi-Lo*	94,552
G-9	1966	Chevy	34,000**	22,650	11,300	366	V8	Tractor	4 Hi-Lo*	30,471
G-10	1969	Ford	43,500**	28,900	14,300	391	V8	Tractor	5 Hi-Lo*	71,581

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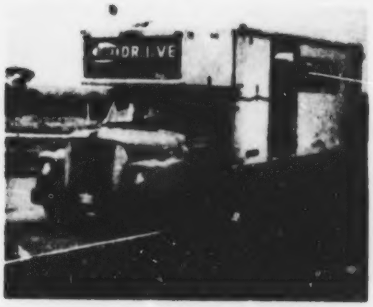
* Hi-Lo means two speed rear axle.

**Gross Combined Weight.

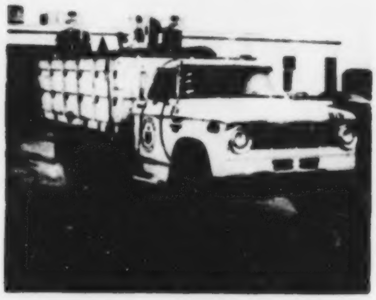
Truck G-1, 1967 Ford With
330 CID Engine, 17,000-lb GVW



Truck G-2, 1968 IHC With
304 CID Engine, 18,200-lb GVW

Truck G-3, 1967 Ford With
300 CID Engine, 10,000-lb GVW

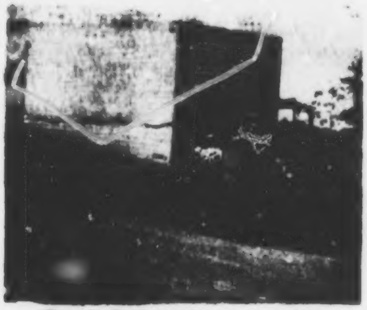
Truck G-4, 1969 Chevy With
350 CID Engine, 18,000-lb GVW



Truck G-5, 1967 Dodge With
318 CID Engine, 19,500-lb GVW

FIGURE 1. GASOLINE POWERED TRUCKS G-1 TO G-5
USED ON SAN ANTONIO ROAD ROUTE TESTS

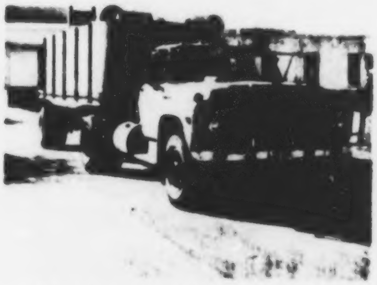
Truck G-6, 1968 IHC With
345 CID Engine, 27,500-lb GVW



Truck G-7, 1965 Chevy With
292 CID Engine, 19,500-lb GVW

Truck G-8, 1965 GMC With
351 CID Engine, 19,500-lb GVW

Truck G-9, 1966 Chevy With
366 CID Engine, 34,000-lb GVW



Truck G-10, 1969 Ford With
391 CID Engine, 43,500-lb GVW

FIGURE 2. GASOLINE POWERED TRUCKS G-6 TO G-10
USED ON SAN ANTONIO ROAD ROUTE TESTS

B. ROAD TEST EQUIPMENT AND PROCEDURES

This section describes the road route and the procedures, equipment and instrumentation used during the field experiments. The description of the road test is presented first, since it was the major test effort, though chronologically the chassis dynamometer tests described in the next section preceded the road test of each truck in the test schedule.

1. Road Route Description

The road course used in this project was the same one laid out by Mr. Bob Olsen (EPA Project Officer of Contract PH 86-67-72) and Mr. Karl Springer, SwRI, several years ago. It was described in detail in Reference 2 as including a variety of truck operation typical of city-suburban delivery. This course was also used for road tests under Contracts EHS 70-113 and 68-01-2113.

The intent was merely to develop a road course that involved several different types of driving such as arterial, residential, urban congested (downtown), commercial, and freeway. This course, shown in Figure 3, includes all these types of driving and the course is one that intentionally makes the test truck drive traffic where many other trucks commonly operate. It is 7.24 miles in length and normally requires about 20 minutes to drive. Figure 4 contains three photographs taken from the back of a truck during a test run. The top photo was taken near point 4, the middle photo on the exit of the Interstate Highway near point 7, and the bottom photo was taken between points 7 and 1. No claim is made about the course being typical of truck operation in the U. S. , or that it is based on driving habits and patterns that have been carefully defined. Several years of effort seem necessary to establish a road driving course that can be agreed to as acceptable and typical of U. S. truck operation.

2. Emissions Measurement Equipment

The exhaust emissions from the road tests were collected and sampled using a constant volume sampler (CVS). A schematic of the CVS is shown in Figure 5. This CVS is similar to the CVS design specified in Federal Regulations for light duty certification testing(3). The sampler utilizes a two speed motor to power the positive displacement blower, giving nominal flow rates of 600 and 900 cubic feet per minute (CFM). The flow rate used in this study was 600 CFM. The upper photograph of Figure 6 shows the CVS during checkout in the laboratory.

The CVS was calibrated prior to the start and periodically during the project using a Meriam laminar flow meter. A propane check, as prescribed in Federal Regulations for light duty certification testing, was performed before each truck was tested on the road to ensure accurate volume measurement by the CVS. Power for the CVS, as well as all other equipment and instrumentation carried aboard the trucks during

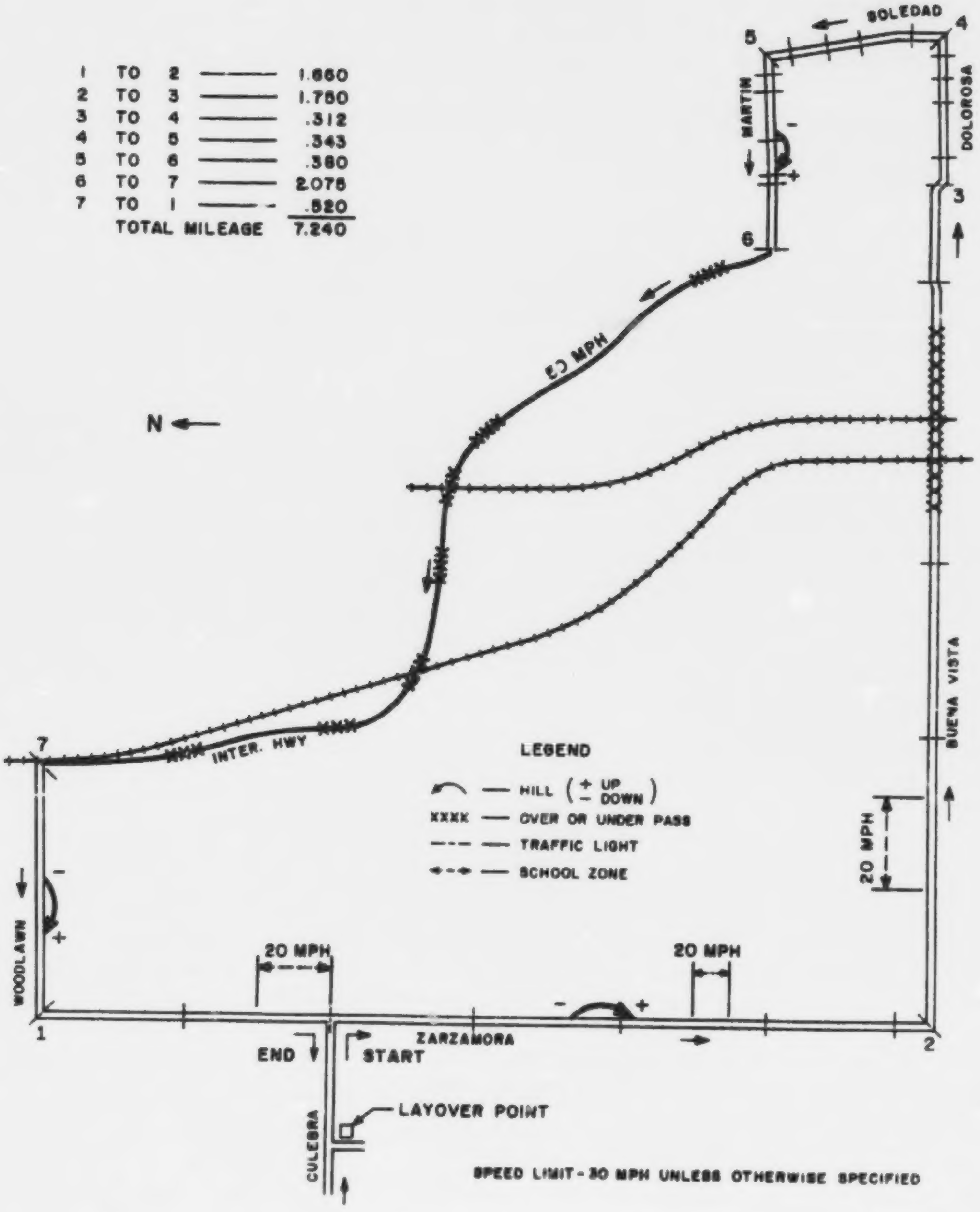
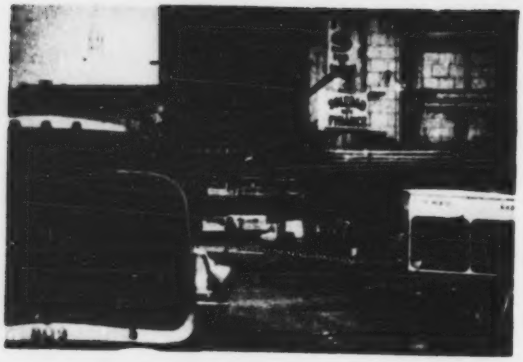

1 TO 2 1.860
2 TO 3 1.750
3 TO 4 .312
4 TO 5 .343
5 TO 6 .380
6 TO 7 2.075
7 TO 1 .520
TOTAL MILEAGE 7.240
SOLEDAD
MARTIN
DOLOROSA
50 MPH
N
INTER. HWY
BUENA VISTA
LEGEND
HILL (+ UP − DOWN)
XXXX — OVER OR UNDER PASS
TRAFFIC LIGHT
SCHOOL ZONE
20 MPH
WOODLAWN
20 MPH
20 MPH
ZARZAMORA
END
START
LAYOVER POINT
CULEBRA
SPEED LIMIT - 30 MPH UNLESS OTHERWISE SPECIFIED
1
2
3
4
5
6
7

FIGURE 3. SAN ANTONIO ROAD ROUTE



Downtown (Near Point 4 on Fig. 3)

Expressway (Near Point 7 on Fig. 3)

Residential (Between Points 7 and 1 on Fig. 3)

FIGURE 4. PHOTOS OF THE SAN ANTONIO ROAD ROUTE TAKEN DURING A TEST RUN

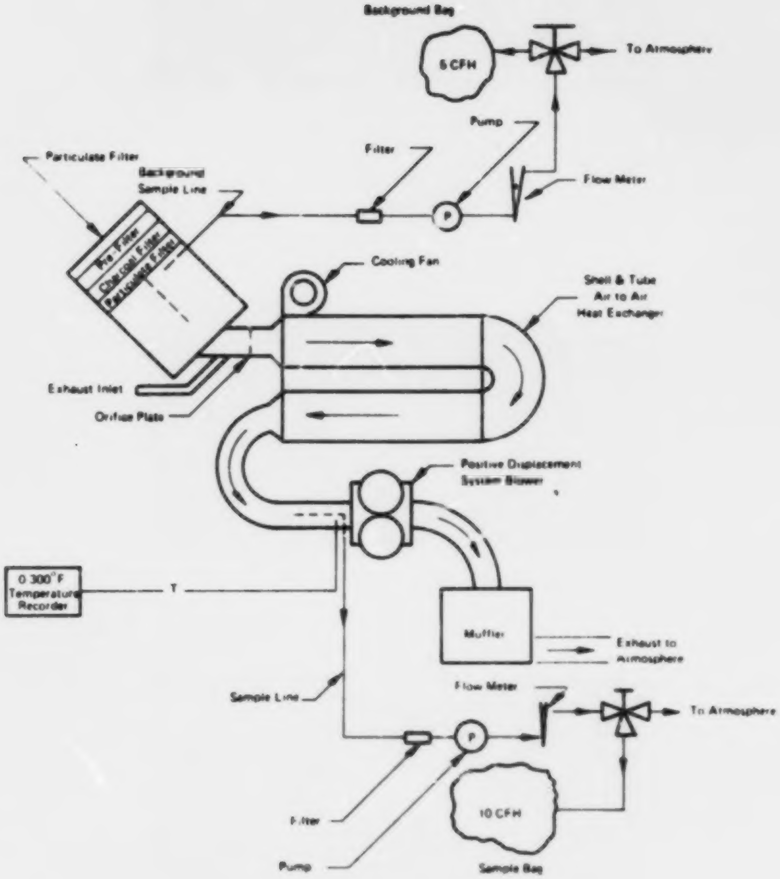
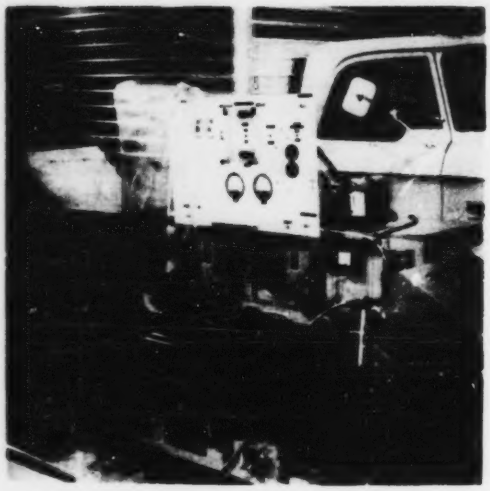
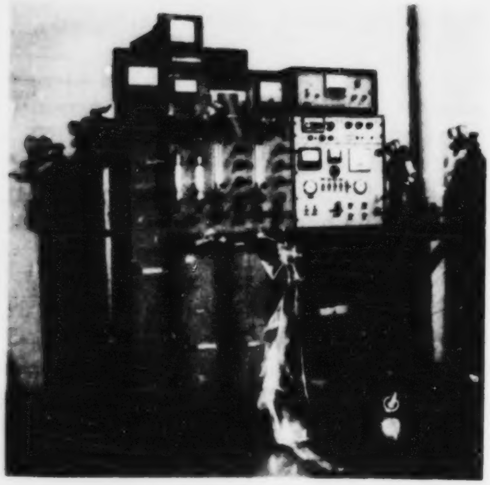

Background Bag
5 CFH
To Atmosphere
Pump
Filter
Particulate Filter
Background Sample Line
Flow Meter
Pre-Filter
Charcoal Filter
Particulate Filter
P
Cooling Fan
Shell & Tube Air to Air Heat Exchanger
Exhaust Inlet
Orifice Plate
Positive Displacement System Blower
0 300°F Temperature Recorder
T
Muffler
Exhaust to Atmosphere
Sample Line
Flow Meter
To Atmosphere
P
10 CFH
Filter
Pump
Sample Bag

FIGURE 5. SCHEMATIC OF TRUCK VERSION OF CONSTANT VOLUME SAMPLER



Heavy Duty Truck CVS



Exhaust Emissions Analysis
System for Bag Samples

FIGURE 6. EXHAUST EMISSION SAMPLE COLLECTION AND ANALYSIS SYSTEM

road testing, was supplied by a trailer-mounted generator. For tractor-trailer rigs the generator was secured on the 27 foot trailer. For the single body two-axle trucks, the generator was towed behind as shown in the picture of Truck G-4 in Figure 1.

The HC, CO, CO_2, and NO_x emission levels were obtained from the CVS sample bags using the analytical instrument train shown in the lower photograph of Figure 6. This instrument system was built to light duty certification test specifications, as outlined in Federal Regulations.(3)

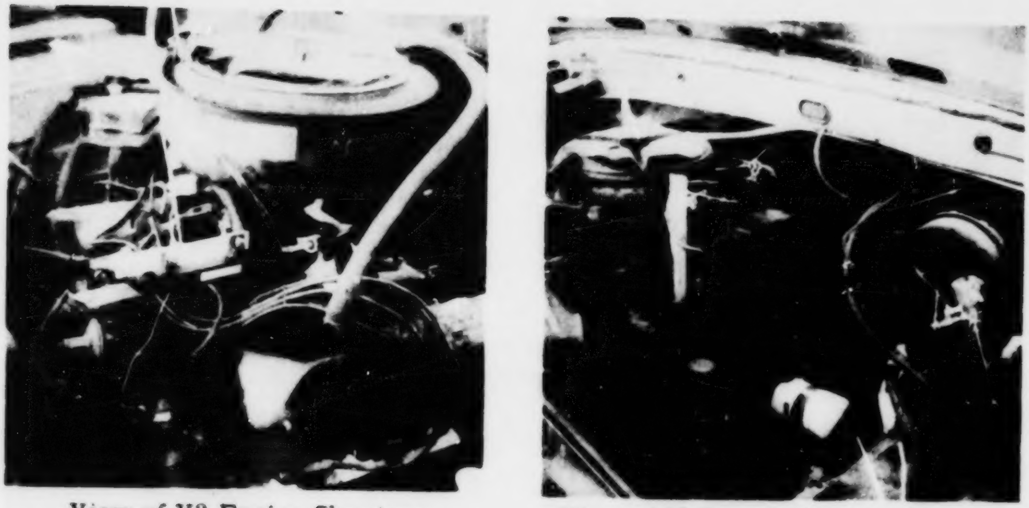
Briefly, the analytical system consists of Beckman non-dispersive infrared (NDIR) analyzers for measurement of CO and CO_2 concentrations and a chemiluminescence (CL) analyzer, built by SwRI to original EPA specifications, for NO_x. NO_x is defined as nitric oxide (NO) plus nitrogen dioxide (NO_2) expressed as NO_2. A Beckman Model 400 flame ionization detector (FID) is used to measure HC concentration in terms of ppm carbon.

The instrument train was calibrated monthly during the project using the Emissions Laboratory "Golden Standard" gases. The concentrations of this set of "Golden Standard" gas cylinders were determined by EPA Mobile Source Pollution Laboratory Branch, Ann Arbor, Michigan.

3. Vehicle Operational Performance Instrumentation

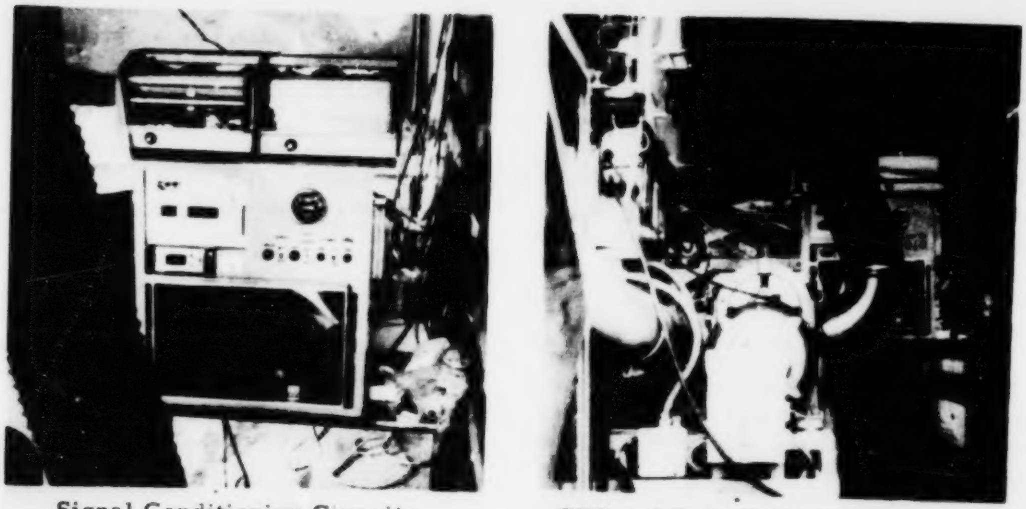
The vehicle operational parameters measured were vehicle speed, engine revolutions per minute, engine fuel flow, and transmission gear position. Vehicle speed was measured using a Labeco fifth-wheel mounted under the bed of the truck or trailer, or in one case mounted behind the generator trailer. The fifth wheel installation can be seen on several trucks in Figures 1 and 2. Engine speed was measured with a Sun electronic tachometer operating off the engine ignition system. The signal lead from the ignition coil can be seen in the top two photographs of Figure 7. Intake manifold vacuum was measured using a Viatran Corp. Model 108 pressure transducer with a 0 to 15 psig vacuum range. Throttle position was obtained from a Bourns linear position transducer Model 108. This linear transducer installation is also shown in the top two photographs of Figure 7. Transmission gear position was fed into the data acquisition system manually by means of a thumbwheel counter.

After undergoing the appropriate signal conditioning, all data were recorded on magnetic tape using a Metrodata Model DL620 Data Logger and a Digi-Data series 1300 digital magnetic tape unit. This system acquired, digitized, and recorded the data on 0.5 inch wide magnetic tape. The system, including the signal conditioning equipment, was housed in a single cabinet as shown in the bottom left photograph of Figure 7. The Metrodata system has a 20 channel scan capacity. In this application, the 20 channel scan was repeated continuously at an effective scan rate of approximately 40 channels per second. The channel assignments are listed on the next page.



View of V8 Engine Showing Throttle Transducer and Engine Tachometer Lead

View of I6 Engine Showing Throttle Transducer, Engine Tach Lead and Fuel Solenoid Valve



Signal Conditioning Circuits, Data Logger, and Magnetic Tape Recorder Installed in Cabinet

CVS and Data Collection System Installed in Van

FIGURE 7. ROAD ROUTE INSTRUMENTATION AND RECORDING EQUIPMENT

Channel	Item Recorded
1, 2	Time in hours, minutes and seconds from internal clock
3, 7, 11, 15	Engine rpm
4, 8, 12, 16	Vehicle speed
5, 9, 13, 17	Intake manifold vacuum
6, 10, 14, 18	Throttle position
19	Transmission gear position

Thus engine rpm, vehicle speed, manifold vacuum and throttle position were sampled approximately eight times per second; while transmission gear position was sampled approximately twice a second. As a backup to the Metrodata system, vehicle speed, engine rpm, manifold vacuum and throttle position were recorded on strip chart recorders. These recorders can be seen on top of the data acquisition system in Figure 7.

Total fuel used during a road course test was determined by supplying fuel from a preweighed five-gallon can during the test run, then weighing the can again after the run. A solenoid valve operated from the CVS sample start switch, shifted the fuel supply from the vehicle fuel tank to test fuel tank. This valve arrangement is shown in upper right photograph of Figure 7. The total fuel weight for the test run was used to determine emissions in grams per pound of fuel consumed and also fuel economy in miles per gallon.

4. Test Procedure

The general test procedure used was the same for all trucks tested, although each truck presented a unique set of problems in the preparation phase. This section will describe the complete test procedure except for details of the chassis nine-mode FTP tests which are presented in the next section.

a. Test Preparation

While driving the truck from the supplier to SwRI, each truck was checked for driveability and safe operation by one of the test technicians. The truck was also weighed on a certified public truck scale to obtain empty weight. Upon arrival at SwRI, the engine tachometer, manifold vacuum transducer, and the throttle position transducer were installed. The engine timing and idle speed were checked. If not within ±3° spark timing or ±100 rpm idle speed of the manufacturer's specifications, these items were adjusted to the specifications. These were the only adjustments made to the engine.

The solenoid valve was then installed in the fuel line to allow operation from the test fuel can. The exhaust system was extended (if necessary) and connected to the CVS inlet with flexible stainless steel tubing. Prior to connecting the CVS to the exhaust system, a propane check was performed on the CVS. The truck was then placed on the chassis dynamometer and two nine-mode FTP tests run as described in the next section.

The fifth wheel was then installed and its calibration checked, as were the calibrations for the other transducers. The truck was then loaded with barrels of water and large concrete blocks to give a total vehicle weight equal to the empty weight plus one-half payload. Payload was defined as GVW (for single body trucks) or GCW (for tractor-trailer combinations) minus the empty weight. The test weight for each truck is listed in Table 1.

b. Conduct of Test

The truck was driven from the laboratory to the road route layover point (about a 20 minute drive) with the CVS in operation to ensure the CVS was at operating temperature prior to beginning road tests. At the layover point, the fifth wheel was lowered into position and the CVS readied for the test run (counters zeroed, sample bags connected, filters changed, etc.). Barometric pressure and wet and dry bulb temperature were also recorded.

The truck was then driven over the road course. At the start of the course the engine fuel supply was shifted from the truck tanks to the test fuel can and exhaust sampling started. At the end of the course, the fuel supply was switched back to the truck tanks and the exhaust sampling stopped. Upon return to the layover point, the pertinent CVS data was recorded. The sample fuel can was replaced by a full can and capped for return to the laboratory. The truck was then readied for the next test, repeating the above procedures. Normally nine test drives around the course were made for each truck, with three drivers each driving three times. The drivers were instructed to drive normally, stay with traffic, yet not exceed posted speed limits.

c. Data Reduction

For the exhaust emissions, the mass of each emission type per test was calculated using the formula for light duty CVS tests found in the Federal Register(3). A computer program was written to process the emissions data, expressing the results in grams/test, grams/minute, grams/pound of fuel, and grams/mile. The computer program also printed out a summary of the results from each test as well as the average results for all tests on a given truck.

The operational data recorded on magnetic tape was processed at the SwRI Computer Laboratory on an H-P 2100 system. The tape was first "dumped" printing the first ten records (there are ten 20 channel data scans per record) of each test, counting the number of data records for each test, and checking that the records were capable of being read correctly by the computer (parity check). If the data on the tape appeared to be correct, the tape was reprocessed using a program to convert the readings to engineering units, calculate average engine speed, vehicle speed, and manifold vacuum and determine the percentage of time spent at discrete increments of these parameters.

If the data on the magnetic tape was not usable, the truck was rerun over the road course to obtain good data, if at all possible. Where this was not possible, the strip chart recordings were manually read, the data transferred to punch cards, and then computer processed to yield the same results as the magnetic tape reduction program.

5. Test Fuel

Table 2 lists the inspection data for the emission test fuel used for all tests during this study. This fuel meets the requirement specified in the Federal Register for exhaust emission tests of heavy duty gasoline powered trucks. The SwRI Department of Emissions Research code number for the fuel was EM-194-F.

TABLE 2. INSPECTION OF LEADED PREMIUM MOTOR GASOLINE USED FOR ALL TESTS
(SwRI Code EM-194-F)

Gravity, deg API (D287)	56.7
Distillation Range (D86)	
Initial Boiling Point, °F	85
5% Point, °F	114
10% Point, °F	131
20% Point, °F	162
30% Point, °F	186
40% Point, °F	206
50% Point, °F	220
60% Point, °F	236
70% Point, °F	254
80% Point, °F	278
90% Point, °F	310
95% Point, °F	327
End Point	352
% Recovery	98.0
% Residue	1.0
% Loss	1.0
Octane No., Research (DI656)	103.5
Total Sulfur, % wt (DI266)	0.009
Reid Vapor Pressure, psi (D323)	8.8
Hydrocarbon Composition (DI319)	
Olefins, %	1.8
Aromatics, %	32.3
Saturates, %	65.9
Lead (Organic) g/gal (D526)	3.17
Phosphorus, Theory	0.0
Oxidation Stability (D525)	1000+
Existent Gum, mg (D381)	1.1
Specific gravity (60°F)	0.752
Density, lbs/gal (60°F)	6.26

C. LABORATORY TEST EQUIPMENT AND PROCEDURE

1. The Chassis Nine-Mode Test

The laboratory test driving schedule was a chassis dynamometer version of the nine-mode Federal Test Procedure for heavy-duty gasoline trucks.(3) This version was contained in the originally proposed Federal standards for heavy-duty trucks as an alternate to the engine dynamometer method but was deleted when the standards were first adopted in June 1968.

The engine conditions run during the nine-mode FTP are shown in Table 3. This schedule is repeated four times for a total running time of 20 minutes. The raw exhaust is continuously sampled and analyzed during the 20-minute test; however, only the average emission levels during the last three seconds of modes 1 to 8, together with the average emission level from all of mode 9, are used to determine the engine emission level.

From 1970 to 1973, the composite emission levels from the nine-mode FTP were expressed in terms of volumetric concentration and there were Federal Standards for HC and CO only. In 1974, the method of expressing the composite emission levels was changed to grams per horsepower hour, standards were added for NO, and the modal weighting factors changed to be equivalent to the percent of total time spent in that mode. Since the results of this project were to be compared with previous tests and since there is no really accurate way to determine engine horsepower on a chassis dynamometer, the 1970 to 1973 nine-mode procedure, as specified in the November 15, 1972 Federal Register, was used for this study.

During a previous project, an attempt was made to determine the correlation between chassis to engine dynamometer operated engines on the nine-mode procedure using ten widely different HDV's. It was found that usually the chassis test was within ±10 percent of the stationary; although for certain contaminants for certain makes, the difference could be as great as ±25 percent.(4)

2. Facility and Equipment

All chassis nine-mode tests were conducted in the laboratory of the Department of Emissions Research. This laboratory is equipped for controlled-environmental operations with the most modern means of emissions sampling and analysis. The chassis dynamometer used for the chassis nine-mode tests is housed in one of the laboratory high bay areas. There is ample room in this area to accommodate all instruments and the largest truck in the fleet. Figure 8 shows a truck on test in the high bay area. The approximate 100 tons of air conditioning and heating are capable of maintaining the laboratory high bay area at 75°F over the entire range of outside ambient temperature experienced in the area.

TABLE 3. FEDERAL NINE-MODE CONSTANT SPEED PROCEDURE FOR HEAVY-DUTY GASOLINE TRUCKS

Modal Sequence Number	Manifold Vacuum	Time in Mode, sec	Cumulative Time, sec	1970-1973 Weighting Factors	1974 Weighting Factors
1	Idle	70	70 (1:10)	0.036	0.232
2	16 in. Hg	23	93 (1:33)	0.089	0.077
3	10 in. Hg	44	137 (2:17)	0.257	0.147
4	16 in. Hg	23	160 (2:40)	0.089	0.077
5	19 in. Hg	17	177 (2:57)	0.047	0.057
6	16 in. Hg	23	200 (3:20)	0.089	0.077
7	3 in. Hg	34	234 (3:54)	0.283	0.113
8	16 in. Hg	23	257 (4:17)	0.089	0.077
9	Closed Throttle	43	300 (5:00)	0.021	0.143

Engine Speed 2000 ± 100 rpm (Modes 2-9)

An initial 5-min idle, two warmup cycles and two hot cycles constitute a complete dynamometer run.

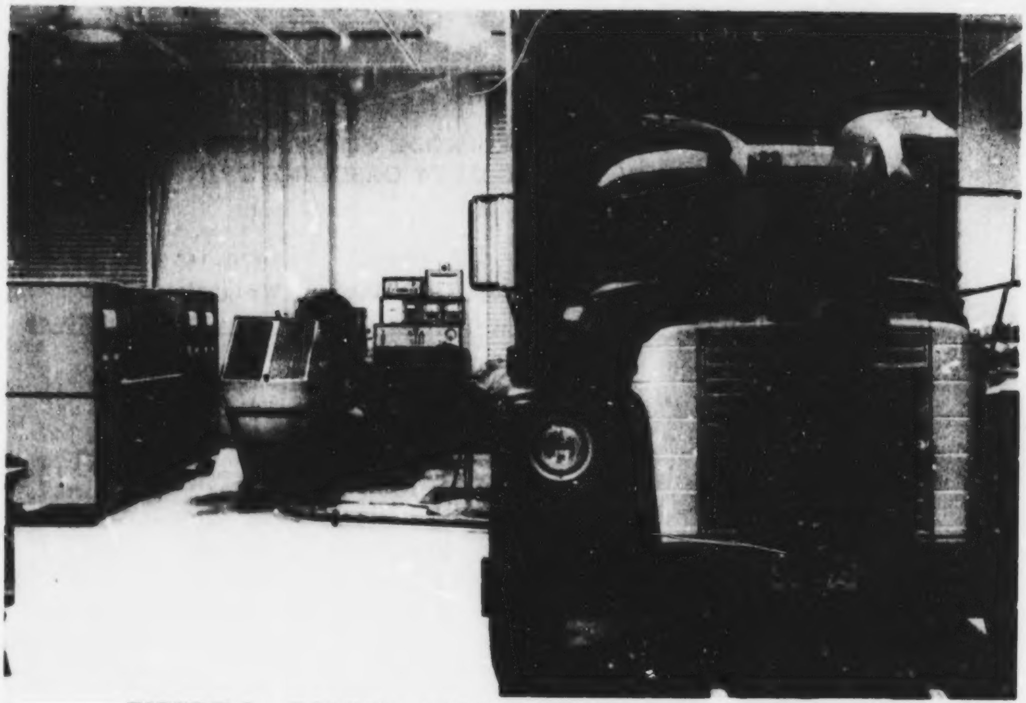


FIGURE 8. PARTIAL VIEW OF EMISSIONS LABORATORY HIGH BAY TEST AREA

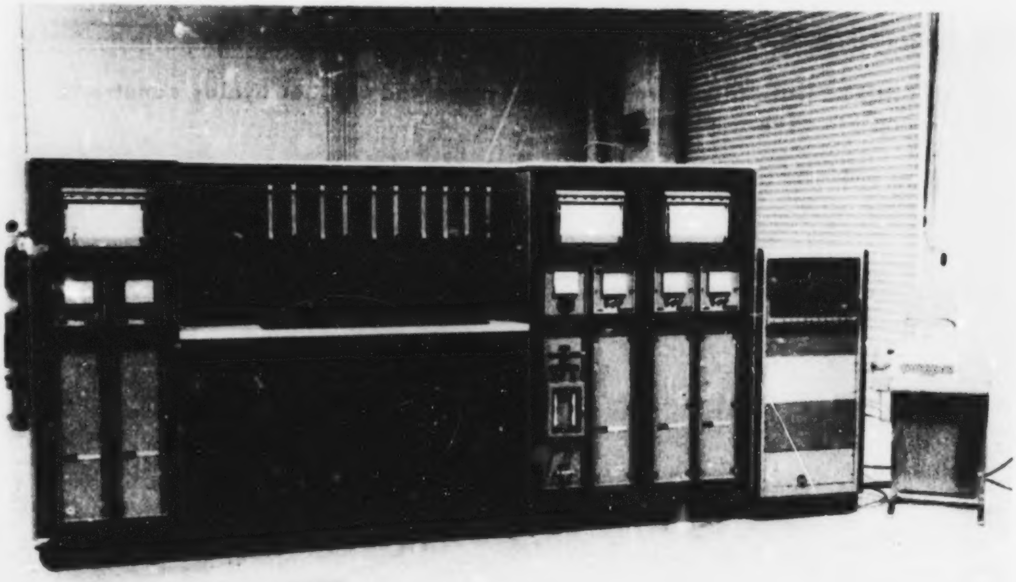


FIGURE 9. NINE-MODE FTP EXHAUST EMISSIONS SAMPLING AND ANALYSIS SYSTEM WITH REAL TIME COMPUTER

Some summer humidity control is obtained with atmospheric water removal in the air conditioning system, but no other humidity control is attempted.

For the laboratory tests, gas sampling and analysis for the nine-mode FTP were accomplished using the system shown in Figure 9. This system includes a gas sampling and analysis train using Beckman non-dispersive infrared (NDIR) gas analyzers in a Beckman-built sampling system and a Data General Super Nova Computer with the necessary peripheral equipment for automatic data acquisition and processing. The NDIR sampling train meets the requirements and specifications established in the Federal Regulations(3) for heavy-duty vehicle exhaust sampling. A flow diagram and component description of the system is contained in the Federal Regulations. Nominal full-scale concentration levels for the five NDIR analyzers are as follows:

1. Low-Range HC - 1000 ppm hexane
2. High-Range HC - 10,000 ppm hexane
3. CO - 11 percent
4. CO_2 - 16 percent
5. NO - 4000 ppm

Monthly calibrations of all NDIR instruments were made throughout the test period by Emissions Laboratory personnel to assure optimum accuracy. Calibrations were performed using the Emissions Laboratory "Golden Standard" gases. This set of 50 gas cylinders had been transported to EPA laboratories and the concentrations defined to EPA standards during a previous study.

The automatic data acquisition system used in conjunction with the analytical instruments was designed and assembled by SwRI. The system's main components are a Data General Super Nova computer with an 8000-word central processor, a Computer Products Series RTP7410 analog to digital converter and multiplexer, and a Model ASR33 teletype. The data acquisition system accepts analog (voltage) signals directly from the NDIR analyzers, digitizes these signals and converts them to the proper units of concentration for processing to obtain the composite values of HC, CO, and NO required by the FTP.

The output of each analyzer is also fed to strip-chart recorders. The concentrations of each contaminant can be obtained from the continuous traces by hand as specified in the nine-mode FTP. The average concentrations are then transferred to computer cards for further processing to obtain composite values for HC, CO, and NO. This method was used as a back-up to the real time data acquisition system.

To perform the nine-mode FTP on a chassis dynamometer requires that the dynamometer have motoring capability. The SwRI chassis dynamometer system used in this and previous projects is a modified Clayton

CT-200 series dynamometer. Up to 200 hp may be absorbed with this water brake-type absorber. This system incorporates a 50 hp, three phase, AC electric motor that, when engaged, will maintain a nearly constant rear wheel speed during power and closed throttle (CT) operation. The electric motor is coupled to the front roll of the chassis dynamometer with a positive drive belt. The vehicle engine speed can be changed by changing vehicle rear wheel speeds either by operating in a different transmission drive gear or changing motor drive pulleys. For the nine-mode FTP, the water brake absorber is unloaded and the load and engine speed are controlled by the electric motor.

3. Test Procedure

The test plan specified duplicate chassis nine-mode tests on each truck, using both the usual nine-mode exhaust sampling system and the CVS system. After the truck had been prepared for testing as described in the previous section, it was placed on the chassis dynamometer and the exhaust system connected to the CVS. The probe for continuous sampling raw exhaust was installed in the exhaust system close to the normal end of the truck exhaust system. The truck was then run at the various vacuum levels specified in the FTP and the engine speed checked using a stroboscopic tachometer to insure that the speed was within ±100 rpm of the specified 2000 rpm with the motor pulleys used. The road test fuel measuring system was connected to obtain fuel used during the test.

The engine was then allowed to soak for an hour prior to starting the test. The gas analyzers were checked using zero level gas and a known concentration gas. Just prior to starting the test, the barometric pressure and wet and dry bulb temperatures were recorded. The radiator cooling fan was started and the engine started and warmed up for five minutes as prescribed in the Federal Regulations.

The nine-mode FTP was then run according to the procedure outlined previously. At the completion of the FTP, the sampling system was checked for hydrocarbon "hang up" and the instrument calibration rechecked. After a one-hour cool down period, the test was repeated. The truck was then readied for road testing as outlined in the previous section.

The CVS was run continuously during each test. Thus, the bagged sample represents the total nine-mode procedure with each mode self-weighted by the percent of total time spent in that mode. The composite results from the continuous exhaust analysis were obtained as prescribed in the Federal Regulations for the 1970 to 1973 nine-mode FTP. The CVS results were calculated in the same manner as the road tests in terms of grams of emissions per minute, and per pound of fuel used.

D. EMISSIONS RESULTS

This section presents the emission test results of both the road studies and chassis dynamometer nine-mode tests. The vehicle operational results are presented in Section E. Comparison of emission levels of the ten pre-controlled trucks with previous studies are incorporated in Part II of this report.

1. Road Route Emission Results

Table 4 presents the average emission level from the SARR tests of each truck in terms of grams per minute, grams per pound of fuel, and grams per mile for the three contaminants measured: HC, CO, and NO_x. For each truck the values shown are the average of the results for six to nine tests, depending on the truck. The average emissions for the total fleet are also shown. Appendix A contains a summary of the emissions for each individual test performed on the trucks. Appendix F contains the detailed computer printout for each test. Please refer to these more extensive listings of results for indications of run-to-run repeatability, etc.

The results shown in Table 4 are the fulfillment of the main purpose of the project. They provide the road emission data which, when combined with data on truck population, usage and fuel consumption, can be used to perform emission inventory and impact studies. The levels of road emissions from these precontrolled trucks are compared to the levels found in previous studies in Part II of this report.

The average numerical values of the emission levels in grams per minute are approximately one-third of the values of the emissions in grams per mile. This is to be expected since the average route speed is approximately 20 mph (0.33 miles per minute). The number values of the average emissions expressed as grams per pound of fuel are about 85 percent of the values of the grams per mile emissions. These rough relationships between the methods of expressing the results are useful in mentally converting from one mode of expression to another in the discussions in this section of the report.

Examination of Table 4 indicates that the range of emission levels found for each contaminant is considerable. The maximum hydrocarbon emission level in terms of grams per minute is approximately 10 times the minimum emission level. This spread is the result of the HC emissions from trucks G-8 and G-9. When results from trucks G-8 and G-9 are not used, the maximum grams per minute HC level is about 3 times the minimum level. These remarks also hold true for HC emissions expressed in grams per mile. The maximum HC level in grams per lb of fuel is approximately 6 times the minimum level considering all trucks tested. If trucks G-8 and G-9 are not included, the maximum grams per pound HC level is about 2.5 times the minimum level. For CO, the

TABLE 4. EMISSIONS FROM PRECONTROLLED GASOLINE POWERED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

Truck Number	Grams per Minute			Grams per lb of fuel			Grams per mile			Fuel Consumption (lbs/test)	Fuel Economy (miles/gal)
	HC	CO	NO_x	HC	CO	NO_x	HC	CO	NO_x		
G-1	8.41	83.0	2.09	24.46	242.6	6.05	23.92	237.2	5.93	7.09	6.37
G-2	7.27	76.3	1.89	22.28	235.3	5.85	21.20	223.1	5.54	7.16	6.59
G-3	3.61	73.7	2.70	11.91	242.9	8.89	10.10	206.3	7.56	6.15	7.36
G-4	11.68	81.3	2.21	29.58	205.7	5.58	31.16	216.9	5.90	7.63	5.93
G-5	9.42	100.4	1.19	24.08	256.5	3.04	25.67	273.4	3.23	7.71	5.86
G-6	5.98	75.2	2.52	12.29	154.0	5.15	17.31	217.4	7.26	10.21	4.44
G-7	7.44	120.7	1.23	16.74	271.3	2.77	19.62	317.9	3.25	8.48	5.35
G-8	31.35	77.9	2.12	76.15	189.3	5.17	100.20	249.0	6.80	9.53	4.74
G-9	25.84	56.0	3.72	66.16	143.5	9.54	83.78	181.2	12.09	9.17	4.94
G-10	6.41	81.0	3.26	13.42	168.9	6.80	20.79	261.3	10.51	11.19	4.04
Average	11.74	82.5	2.29	29.71	211.0	5.88	35.38	238.4	6.81	8.43	5.56
Maximum Truck Avg.	31.35	120.7	3.72	76.15	271.3	9.54	100.20	317.9	12.09	11.19	7.36
Minimum Truck Avg.	3.61	56.0	1.19	11.91	143.5	2.77	10.10	181.2	3.23	6.15	4.04

maximum value is approximately twice the minimum value, regardless of the method of expressing the results. The maximum NO_x emission level is approximately 3 times the minimum level, for all three methods of expressing the emissions.

Truck G-8 and G-9 deserve special discussion because of the large HC emission levels from the road tests of these trucks. As will be seen in subsection E of the report, the chassis dynamometer nine-mode test results for these two trucks are quite average, except for the higher than usual NO_x level of truck G-9. However, these two trucks exhibited HC levels during the road tests that were over twice as high (in terms of grams per pound of fuel burned) as any truck tested in this study. These high levels were detected as the sample bags were analyzed during the road testing and measures were taken to ensure that the HC readings were valid. The zero and span of the FID instrument were checked and a bag filled from one of the gas cylinders used as a laboratory standard was also analyzed. An examination of the background bag HC levels showed them to be within the normal range of background HC found on previous tests. If the analyzer had been incorrectly spanned or malfunctioning, these values would also have been erroneously high. Since this was not the case, it was concluded that the sample values were valid.

The reason for the high HC levels is not known. Both trucks appeared to run satisfactorily, with no driver complaints or comments. However, after truck G-9 demonstrated roughly the same high HC levels that were observed on truck G-8, it was decided to do some checks on the engine condition after completion of testing. Recall that the purpose of this study was to test the trucks as they were maintained in the field and not to tune up each truck before testing. Of course, obvious engine malfunctions, such as a loose spark plug wire, etc., would be fixed prior to testing. The timing and idle speed are also set to manufacturers specifications prior to test.

At the conclusion of testing of truck G-9, the engine was given a minor tune up and each cylinder's compression pressure checked. The pressure in two cylinders was found to be significantly out of specification value. It was felt that this was a valve problem and not due to worn piston rings, although either could be a cause. It is hypothesized that low cylinder pressure is the cause of the unusually high HC levels seen on the road tests of these two trucks. It is significant that the nine-mode test results did not show higher than usual HC levels. This may indicate that there are some items of engine deterioration that are not detectable by the nine-mode test. This may be an area that warrants further study.

As was done in the analysis of previous road studies,(5, 6) the make and displacement of each engine was rank ordered according to its emission levels. This ranking is shown in Table 5 for HC, CO, NO_x in terms of grams per pound of fuel and grams per mile. The ranking in terms of

TABLE 5. RANK ORDER OF SARR EMISSION RATES BY MAKE AND CID - LOWEST TO HIGHEST

	HC	CO	NO_x
		Grams per lb of Fuel	
1	Ford 300	Chevy 366	Chevy 292
2	IHC 345	IHC 345	Dodge 318
3	Ford 391	Ford 391	IHC 345
4	Chevy 292	GMC 351	GMC 351
5	IHC 304	Chevy 350	Chevy 350
6	Dodge 318	IHC 304	IHC 304
7	Ford 330	Ford 300	Ford 330
8	Chevy 350	Ford 330	Ford 391
9	Chevy 366	Dodge 318	Ford 300
10	GMC 351	Chevy 292	Chevy 366
		Grams per Mile	
1	Ford 300	Chevy 366	Dodge 318
2	IHC 345	Ford 300	Chevy 292
3	Chevy 292	Chevy 350	IHC 304
4	Ford 391	IHC 345	Chevy 350
5	IHC 304	IHC 304	Ford 330
6	Ford 330	Ford 330	GMC 351
7	Dodge 318	GMC 351	IHC 345
8	Chevy 350	Ford 391	Ford 300
9	Chevy 366	Dodge 318	Ford 391
10	GMC 351	Chevy 292	Chevy 366

grams per pound of fuel is not the same as the ranking in terms of grams per mile. This is primarily due to truck-to-truck differences in fuel consumption, which are largely functions of vehicle test weight. See Section E, Vehicle Operational Performance, for discussion of this aspect of the test. Grams per pound of fuel is used to express the emission levels for two reasons. First, since fuel used is proportional to the energy put into the system, it can be seen that grams per pound of fuel is compatible with the idea of expressing emissions on a per unit of work produced (grams/brake horsepower-hr) that is currently used in Federal certification testing. Secondly, it affords a means of comparison between the road test results and the chassis dynamometer results. Emission levels in terms of grams per mile are included for use in national and regional impact and related air pollution inventory studies. It is not a preferred method for comparing one truck to another.

From the small sample of ten trucks, it is difficult to ascertain any relationship between engine manufacturer and emission level from Table 5 because of the small number of trucks tested. Examination of the table does reveal a possible relationship between engine displacement and the emission levels of CO and NO_x in terms of grams per pound of fuel. To check this, a regression analysis and analysis of variance was performed on CO and NO_x, using engine cubic inch displacement (CID) as the independent variable. From the analysis of variance, the relationship between CID and CO proved to be significant at the 0.01 significance level. In other words, there is a one percent or less possibility that the relationship was due to pure chance. The relationship between CID and NO_x was not significant at the 0.01 significance level. Figure 10 shows CO in grams per pound of fuel as a function of CID, together with the regression line from the linear regression analyses. Apparently road emissions of CO in terms of grams per pound of fuel are a function of engine displacement, decreasing as displacement increases.

To determine if there were any other relationships between the emission levels from the road tests and any other engine or vehicle variable, a correlation study was done, using a correlation matrix. The variables used were HC, CO, and NO_x in terms of both grams per pound of fuel and grams per mile, engine displacement, vehicle test weight, and vehicle odometer mileage. The correlation matrix is shown in Table 6.

The correlation coefficient is a measure of how well a regression line fits the observed data. The algebraic sign of the value indicates the slope of the regression line. A positive value indicates that the dependent variable (Y) increases as the independent variable (X) increases. A negative value indicates that Y decreases as X increases. The closer the correlation coefficient is to ±1, the better the equation fit. It is a subjective judgement as to the value of the correlation coefficient that would indicate a valid relationship. For the brief analysis here, a correlation coefficient whose absolute magnitude is 0.60 or more is taken to

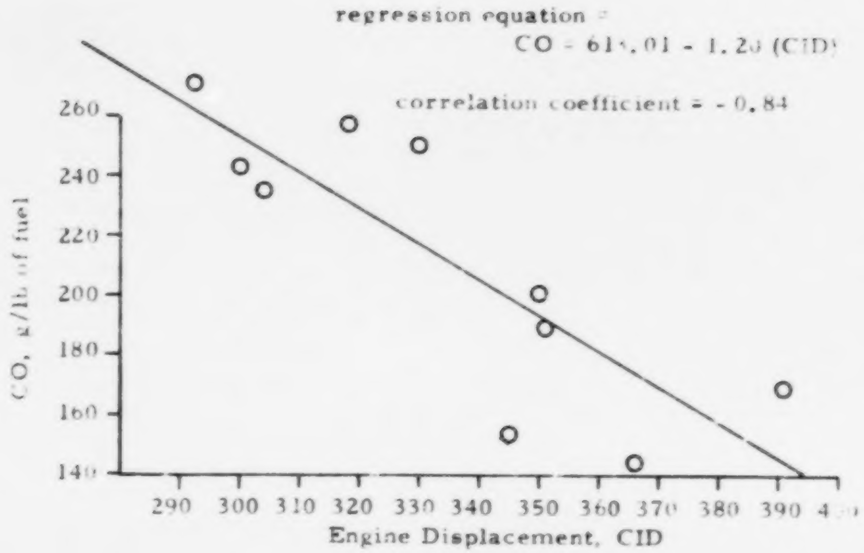


FIGURE 10. RELATIONSHIP BETWEEN ENGINE DISPLACEMENT AND ROAD TEST CO EMISSIONS IN GRAMS PER POUND OF FUEL

TABLE 6. MATRIX OF CORRELATION COEFFICIENTS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

	Emissions, g/lb of fuel			Emissions, g/mile					
	HC	CO	NO_x	HC	CO	NO_x	CID	Vehicle Test Wt.	Odometer Mileage
HC, g/lb of fuel	1.00000	-0.40264	0.23894	$\boxed{0.99112}$	-0.27204	0.33783	0.35929	0.11713	0.35624
CO, g/lb of fuel		1.00000	-0.49498	-0.47158	0.55355	$\boxed{-0.81851}$	$\boxed{-0.83413}$	$\boxed{-0.69440}$	-0.23607
NO_x, g/lb of fuel			1.00000	0.22741	$\boxed{-0.81434}$	$\boxed{0.84409}$	0.35651	0.21290	0.18293
HC, g/mile				1.00000	-0.23310	0.38364	0.42463	0.19939	0.41454
CO, g/mile					1.00000	$\boxed{-0.62941}$	-0.29430	-0.03417	-0.05496
NO_x, g/mile						1.00000	$\boxed{0.74058}$	$\boxed{0.65162}$	0.20512
CID							1.00000	$\boxed{0.74114}$	-0.08974
Vehicle Test Wt.								1.00000	-0.08918
Odometer Mileage									1.00000

suggest the possibility of such a relationship. The variable pairs which fell into this category are circled in Table 6. As would be expected, there is generally a relationship between each emission in g/lb of fuel and its level expressed in g/mile. A relationship between g/mile CO and g/lb of fuel NO_x seems to be indicated, as does a relationship between g/mile NO_x and g/lb of fuel CO. These relationships are curious indeed. A more relevant relationship is indicated between CO in g/mile and NO_x in g/mile; a relationship that has been seen between mass emissions of CO and NO in other studies. The correlation between CO in grams/lb of fuel and CID has been discussed.

Other possible relationships are: CO in grams per pound of fuel and vehicle test weight, NO_x in grams per mile and both CID and vehicle test weight, CO in grams per mile and NO_x in grams/mile, and lastly, engine CID and vehicle test weight. While further analysis of these variables such as regression analyses and graphs of the data could be done, it is felt that identifying the possible relationship is sufficient for the purposes of this report. Certain items such as engine manufacturer, transmission, and number of cylinders may have an effect on emissions also. Since these are discrete variables, analysis of variance techniques were used to determine if there was a relationship between these items and the road emissions. One-way analyses of variance were performed on HC, CO, and NO_x in terms of grams per pound of fuel with engine manufacturer, number of cylinders, and number of transmission speeds as independent variables. The results of these analyses indicate that none of these three items were significant at either the 0.01 or 0.1 significance level.

While the units used to express the road test exhaust emissions are useful in defining emissions-related relationships and in estimating national and regional impact of trucks, they do not take into account the values to society of the truck itself. Oneway would be to express emissions in grams per vehicle ton-mile. A ton-mile is herein defined as the vehicle test weight in tons times the miles travelled. Table 7 lists the road test emissions from the ten trucks in terms of grams per ton-mile and the fuel economy in terms of ton-miles per gallon. The use of ton-miles per gallon as a measure of fuel economy is included to also attempt to include social value in the fuel economy measurement. Certainly, large trucks use more fuel than small trucks, but they also haul more. The ton-mile per gallon fuel economy figure is an attempt to provide a more meaningful measure of economy of trucks. Figure 11 presents the grams per ton-mile emissions in histogram form for easy reference.

2. Laboratory Emission Results

The results of the chassis dynamometer version of the nine-mode tests are listed in Table 8 in terms of volumetric concentrations and in grams per pound of fuel expended. These are the average values of two or three replicate runs made on each truck. The two expressions of emission

TABLE 7. ROAD EXHAUST EMISSIONS IN GRAMS PER TON MILE FROM TEN PRECONTROLLED GASOLINE POWERED TRUCKS OPERATED OVER THE SARR

Truck Number	Emissions, Grams per Ton-Mile			Fuel Economy
	HC	CO	NO	Ton Miles/gallon
G-1	3.86	38.3	0.96	39.5
G-2	2.85	30.0	0.74	49.1
G-3	2.21	45.1	1.65	33.6
G-4	4.63	32.2	0.88	40.0
G-5	3.70	39.4	0.47	40.7
G-6	1.83	22.9	0.77	42.1
G-7	2.64	42.8	0.44	39.7
G-8	12.55	31.2	0.85	37.9
G-9	7.40	16.0	1.07	56.0
G-10	1.44	18.1	0.73	58.4
Average	4.31	31.6	0.86	43.7

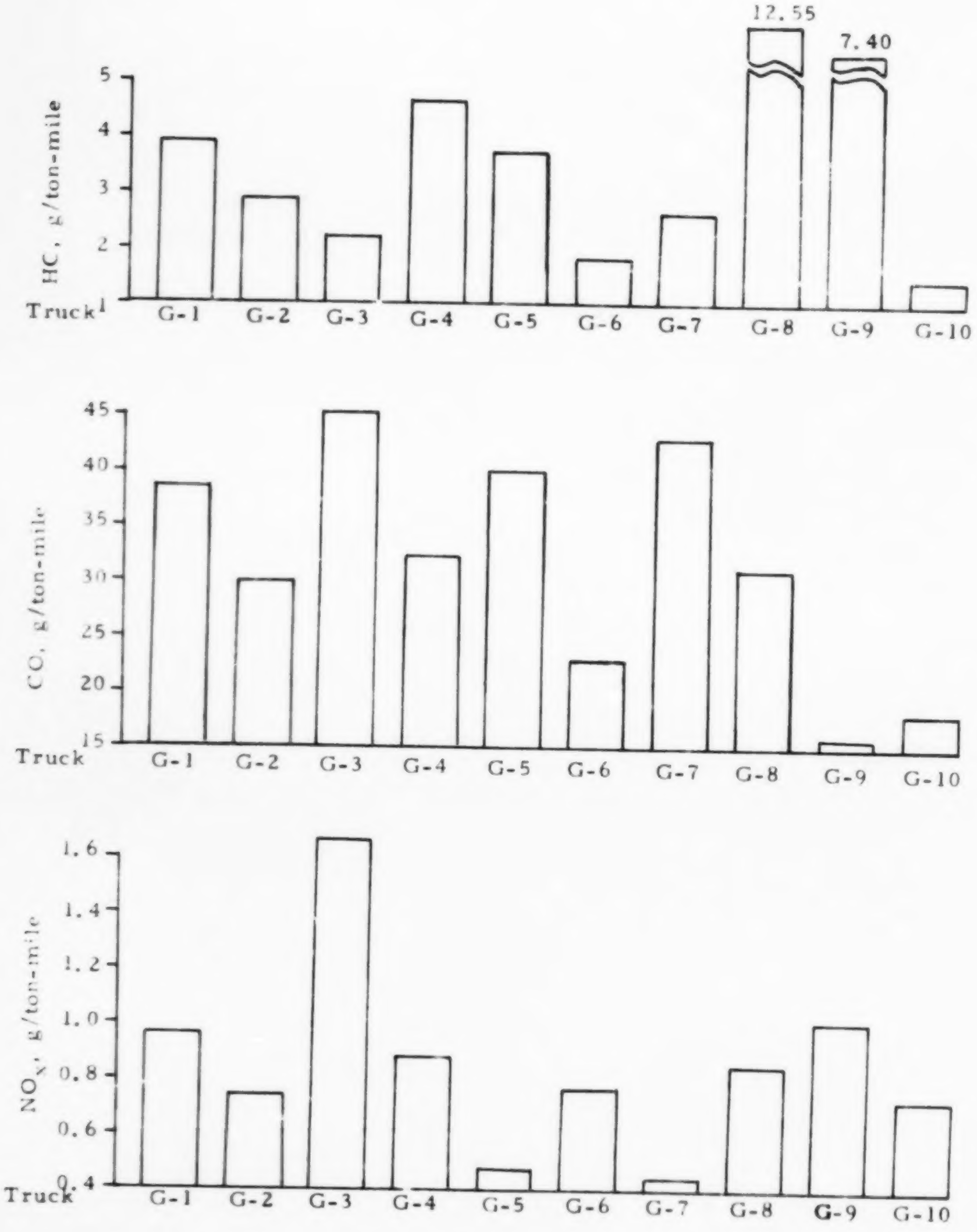


FIGURE 11. ROAD EXHAUST EMISSIONS IN GRAMS PER TON MILE FOR TEN PRECONTROLLED TRUCKS OPERATED OVER THE SARR

TABLE 8. EMISSIONS FROM CHASSIS VERSION NINE-MODE FTP RUNS ON PRECONTROLLED TRUCKS

Truck	*Composite Emission Concentrations-PPM			Emissions in grams/lb of fuel			
Number	HC	CO	Corr. NO	HC	CO	NO_x	lbs of fuel
G-1	398	4.56	1135	19.60	254.3	7.02	6.58
G-2	458	2.79	1471	24.58	162.0	9.61	5.83
G-3	328	3.80	1511	13.42	214.6	9.58	5.89
G-4	473	4.42	924	26.98	188.7	6.58	7.40
G-5	565	4.15	1279	18.68	247.8	6.62	5.48
G-6	160	0.93	848	5.33	59.7	6.67	5.63
G-7	288	4.37	1157	11.23	246.6	6.55	5.50
G-8	390	3.49	1147	14.26	191.5	6.61	7.39
G-9	384	1.93	1698	14.52	111.3	12.27	6.71
G-10	284	4.66	631	10.30	233.0	4.33	7.22
Average	373	3.51	1180	15.89	191.0	7.58	6.36

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*Chassis version of 1970-1973 9-mode FTP.

levels are derived from two different sampling techniques. The volumetric concentrations are from raw exhaust sampling according to the nine-mode FTP. The grams per mile levels are the results of CVS sampling of the exhaust during the nine-mode FTP as explained in Section C.

Appendix B contains the summary results of each individual nine-mode test in terms of volumetric concentrations. Appendix C presents the summary results of each nine-mode test in mass units. Appendix G contains the computer printout sheets for each individual test of each truck in terms of concentrations. Appendix H contains the printout sheets for the individual trucks in mass units.

Figure 12 is a histogram of the average nine-mode emission levels in terms of volumetric concentrations. Also shown on the figure are the Federal standards for HC and CO for model years 1970 to 1973. These standards are shown only for reference purposes. The test procedure in this study utilized a chassis dynamometer with the engine remaining in the vehicle, while the actual Federal certification procedure tests the engine outside the vehicle on an engine dynamometer. As explained in Section C of this report, the correlation between engine and chassis dynamometer was investigated in an earlier project. While the differences in emissions were not great, no specific correlation was found. Thus, the Federal standards should not be compared with the results of these tests to determine if a particular engine would or would not meet the Federal standards.

Table 9 ranks the emissions from the nine-mode tests by engine make and displacement as was done for the road tests. The table shows the ranking for HC and CO in terms of volumetric concentrations and grams per pound fuel. It should be remembered that the volumetric concentrations and the grams per pound of fuel values are not just different ways of expressing the same test result. They are simultaneously obtained by different sampling techniques; the volumetric concentrations from continuous sampling of the raw exhaust, and the grams per pound of fuel from CVS sampling of the dilute exhaust. Also from the continuous sampling of raw exhaust, NO was measured using an NDIR analyzer, while from the CVS dilute sample, NO_x ($NO + NO_2$) was measured using a chemiluminescent analyzer.

Comparing the rank order by the two methods, it can be concluded that while the rankings are similar, they are not identical. The HC emission rankings demonstrate the closest agreement. The question then arises as to whether there is a relationship between the nine-mode emissions concentration levels and the emissions in grams per pound of fuel obtained from the CVS sampling during the nine-mode test. The easiest way to determine this is to plot the two emission expressions for each emission type as is done in Figure 13. It does appear that there is a relationship, although for HC and NO_x it does not appear to be a linear function.

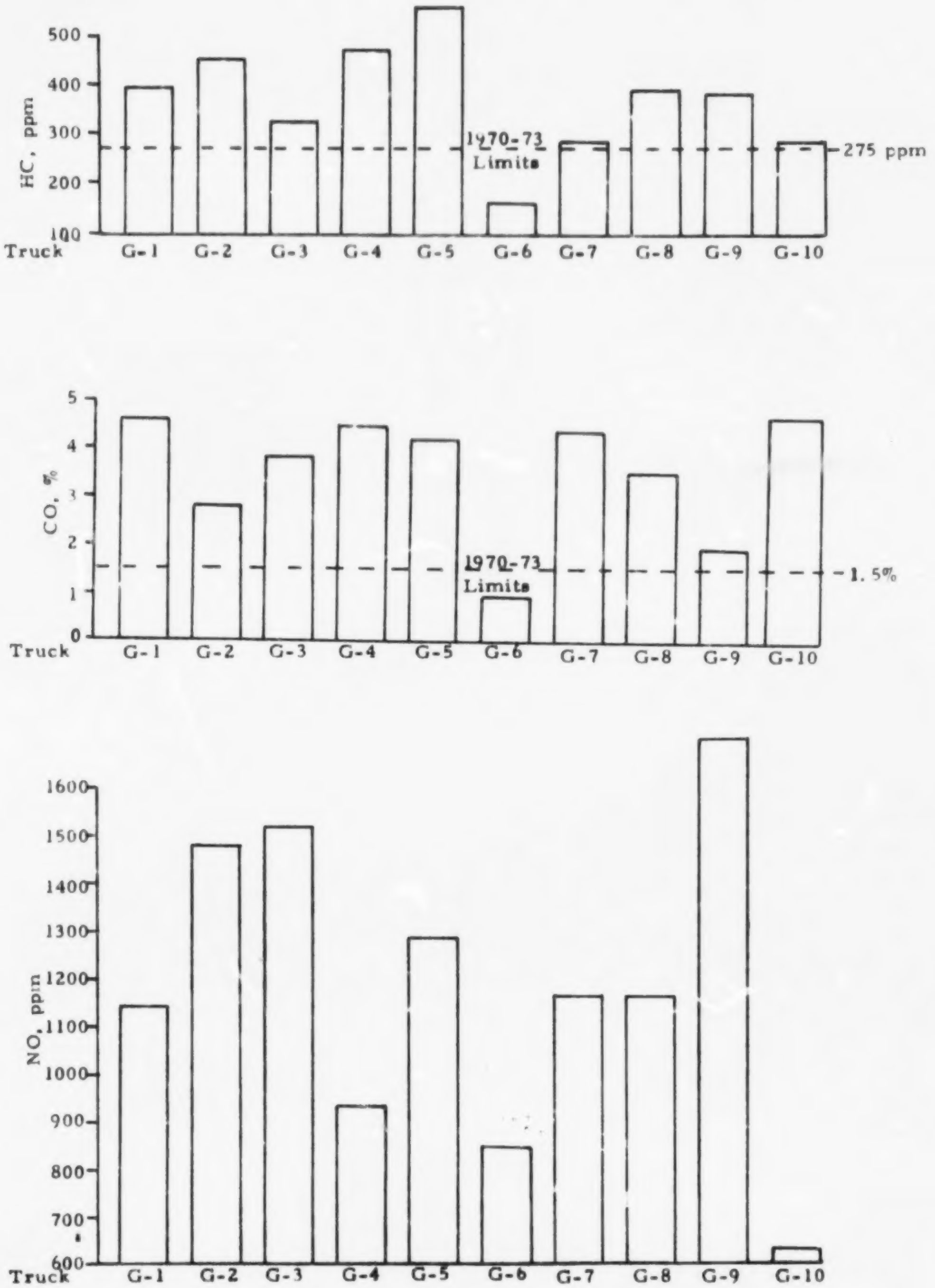


FIGURE 12. HC, CO, AND NO EMISSIONS FROM CHASSIS VERSION NINE-MODE FTP RUNS ON PRE-EMISSION CONTROLLED TRUCKS

TABLE 9. RANK ORDER OF CHASSIS NINE-MODE EMISSION RESULTS BY MAKE AND CID
(Lowest to Highest)

Volumetric Concentration

HC (ppm)	CO (%)	NO (ppm)
IHC 345	IHC 345	Ford 391
Ford 391	Chevy 366	IHC 345
Chevy 292	IHC 304	Chevy 350
Ford 300	GMC 351	Ford 330
Chevy 366	Ford 300	GMC 351
GMC 351	Dodge 318	Chevy 292
Ford 330	Chevy 292	Dodge 318
IHC 304	Chevy 350	IHC 304
Chevy 350	Ford 330	Ford 300
Dodge 318	Ford 391	Chevy 366

Grams per Pound of Fuel

HC	CO	NO_x
IHC 345	IHC 345	Ford 391
Ford 391	Chevy 366	Chevy 292
Chevy 292	IHC 304	Chevy 350
Ford 300	Chevy 350	GMC 351
GMC 351	GMC 351	Dodge 318
Chevy 366	Ford 300	IHC 345
Dodge 318	Ford 391	Ford 330
Ford 330	Chevy 292	Ford 300
IHC 304	Dodge 318	IHC 304
Chevy 350	Ford 330	Chevy 366

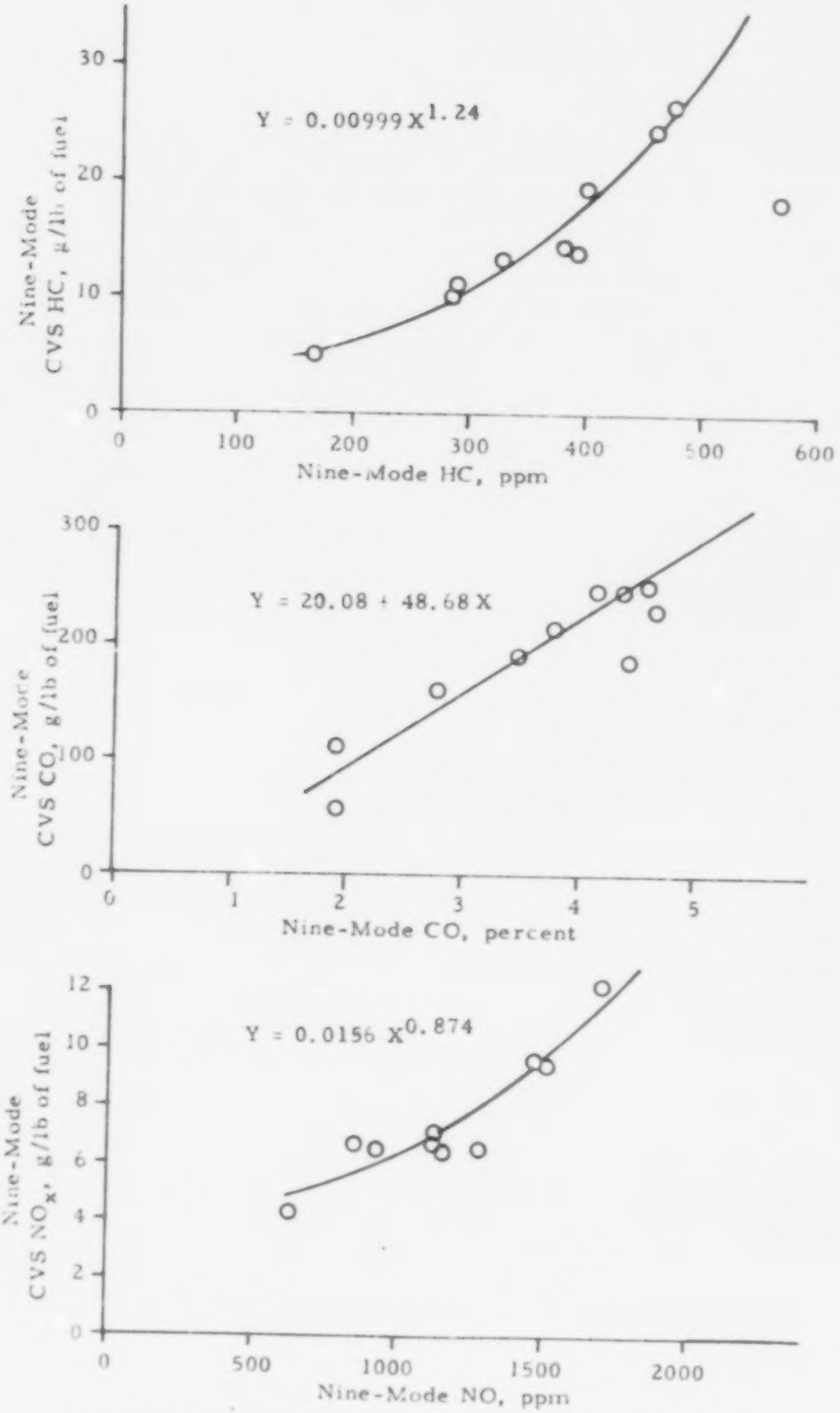


FIGURE 13. RELATIONSHIP OF NINE-MODE FTP EMISSION CONCENTRATION AND NINE-MODE CVS MASS EMISSIONS FOR PRE-EMISSION CONTROLLED TRUCKS

To obtain a statistical indication of the relationship, a linear regression analysis was performed for each emission specie. Since HC and NO_x appeared to have, at least, a second order equation, the linear transformation of the equation $Y = AX^B$ was used in the regression analysis. The regression analysis produced the equations shown on Figure 13 with correlation coefficients of 0.93, 0.95, and 0.91 for HC, CO, and NO_x, respectively, which for the limited data used indicates a good equation fit. An analysis of variance was also performed for the regression, indicating that the relationship between the variables was significant at the 0.01 significance level for each emission. This relationship may be useful in comparing this study with other test results from the nine-mode FTP.

Also of interest is the relationship between the chassis nine-mode emissions, in grams per pound of fuel and the road test emissions. Table 10 presents this comparison for each truck tested, together with the comparison of the average emissions for all ten trucks. The ratio of the nine-mode emission level to the road emission level is shown for HC, CO, and NO_x. The fuel consumption comparison for the two types of tests is also shown. Since the HC emission comparisons for trucks G-8 and G-9 are believed to represent atypical, but real, comparison ratios, the average ratio of HC emissions has been shown both including and excluding trucks G-8 and G-9.

As was done in the final report of the road studies of diesel trucks,(6) the nine-mode emissions and road test emissions in terms of grams per pound of fuel for HC, CO, and NO_x have been plotted against each other in Figure 14 to facilitate comparisons. Also shown on the plots are the lines of one-to-one correspondence (equivalent to a 1.00 nine0mode emission to road emission ratio) and the lines showing fleet average comparison ratio for each emission. The comparison ratio used for HC excluded trucks G-8 and G-9. It appears from these plots that perhaps a better average comparison ratio might be one that was a function of the emission level rather than an arithmetic mean, although there is insufficient data from this study to develop that relationship.

The emission results and relationships in this section were developed with the goal of presenting the results of the road studies in a form that would be usable for national and regional impact studies and provide some indication of the behavior of truck exhaust emissions under actual road conditions. Some remarks are then appropriate on the use of these emission results.

3. Use of Emission Results

There are many ways in which the road emission results from this study may be used. They can be used directly to help estimate national, regional, or local emissions impact from this category of mobile sources. The emission rates or factors in terms of g/mi and g/lb of fuel are both

TABLE 10. COMPARISON OF CHASSIS NINE-MODE AND ROAD ROUTE EMISSIONS, AND FUEL CONSUMPTION FOR PRECONTROLLED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

Truck Number	Year	Make	Engine CID	Test Wt. lb.	Nine-Mode Emissions in grams/lb of fuel HC	Nine-Mode Emissions in grams/lb of fuel CO	Nine-Mode Emissions in grams/lb of fuel NO_x	Nine-Mode Fuel Cons. lb.	Road Route Emissions in grams/lb of fuel HC	Road Route Emissions in grams/lb of fuel CO	Road Route Emissions in grams/lb of fuel NO_x	Road Route Fuel Cons. lb.	Ratio of Nine-Mode/Road Route HC	Ratio of Nine-Mode/Road Route CO	Ratio of Nine-Mode/Road Route NO_x	Ratio of Nine-Mode/Road Route Fuel
G-1	1967	Ford	330	12,400	19.60	254.3	7.02	6.58	24.46	242.6	6.05	7.09	0.80	1.05	1.16	0.93
G-2	1968	IHC	304	14,900	24.58	162.0	9.61	5.83	22.28	235.3	5.85	7.16	1.10	0.69	1.64	0.81
G-3	1967	Ford	300	9,140	13.42	214.6	9.58	5.89	11.91	242.9	8.89	6.15	1.13	0.88	1.08	0.95
G-4	1969	Chevy	350	13,475	26.98	188.7	6.58	7.40	29.58	205.7	5.58	7.63	0.91	0.92	1.18	0.97
G-5	1967	Dodge	318	13,875	18.68	247.8	6.62	5.48	24.08	256.5	3.04	7.71	0.78	0.97	2.18	0.71
G-6	1968	IHC	345	18,960	5.33	59.7	6.67	5.63	12.29	154.0	5.15	10.21	0.43	0.39	1.30	0.55
G-7	1965	Chevy	292	14,850	11.23	246.6	6.55	5.50	16.74	271.3	2.77	8.48	0.67	0.91	2.36	0.65
G-8	1965	GMC	351	15,970	14.26	191.5	6.61	7.39	76.15	189.3	5.17	9.53	0.19	1.01	1.28	0.78
G-9	1966	Chevy	366	22,700	14.52	111.3	12.27	6.71	66.16	143.[illegible]	9.54	9.17	0.22	0.78	1.29	0.73
G-10	1969	Ford	391	28,900	10.30	233.0	4.33	7.22	13.42	168.9	6.80	11.19	0.77	1.38	0.64	0.65
				Average	15.89	191.0	7.58	6.36	29.71	211.0	5.88	8.43	0.70	0.90	1.41	0.77
									HC average without G-8 & G-9				0.82			

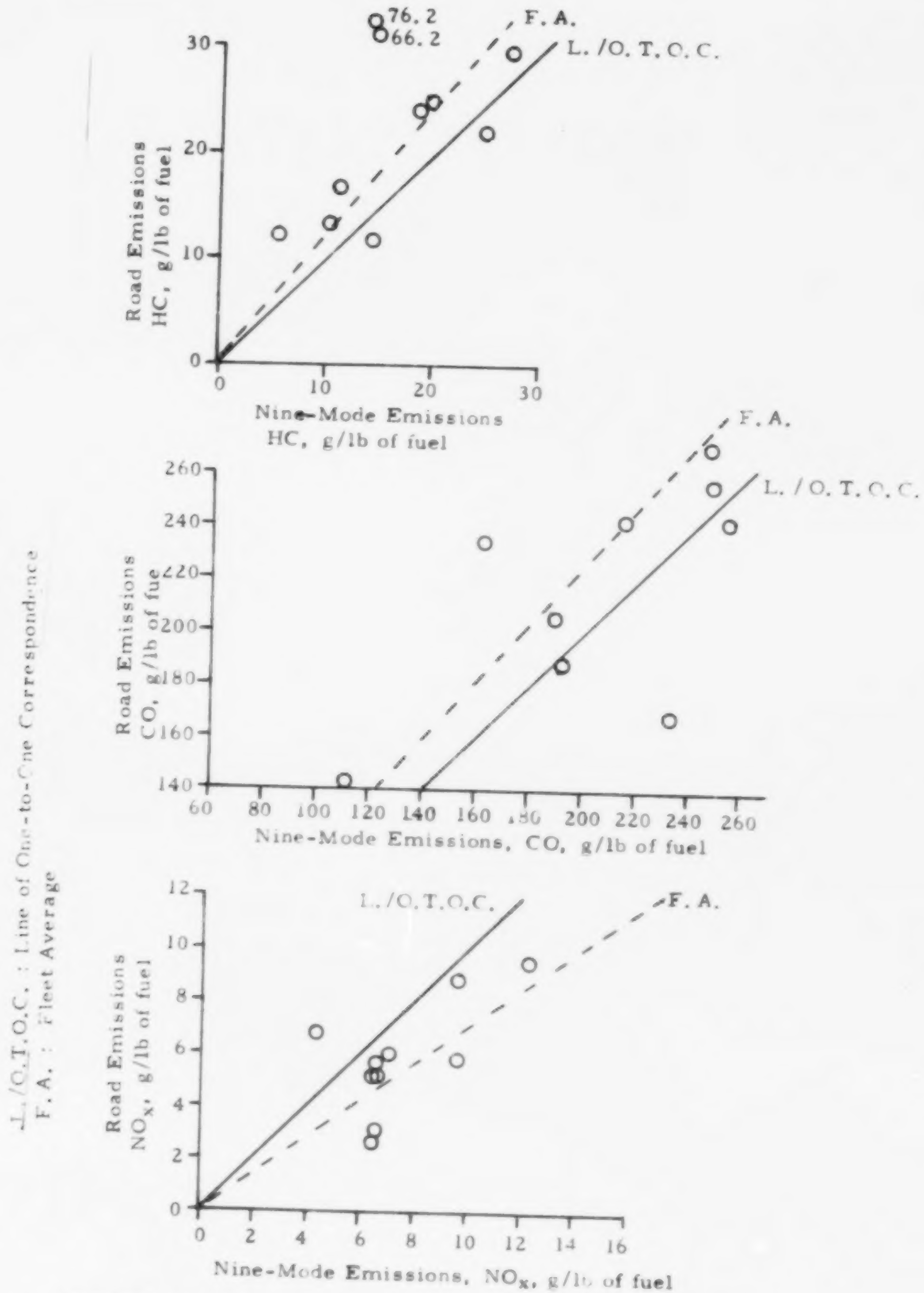


FIGURE 14. RELATIONSHIP OF NINE-MODE CVS MASS EMISSIONS AND ROAD TEST MASS EMISSIONS IN GRAMS PER POUND OF FUEL FOR PRE-EMISSION CONTROLLED TRUCKS

helpful in approaching the impact and each can be used somewhat independently to arrive at the estimate from two standpoints.

The recommended method involves much more work, but will be more defensible in determining impact. Sales and usage data for trucks over 6000 pounds should be employed to obtain "sales-weighting factors" and "use-weighting factors". Such weighting factors, not easily determined, should then be applied to the emissions from the individual trucks for a more accurate assessment of impact on the environment. The ten-truck data from this study should also be used in conjunction with other precontrolled truck emission data to increase the size of the data base. However, emissions data on precontrolled trucks are apparently scarce. One source of data is from the work done by SwRI for, what was at that time, NAPCA under Contract PH 86-67-72. Unfortunately, the data from this study is not in a form to directly compare the two studies, though with some work it might provide some useful comparisons.

Only under circumstances of national or regional air pollution impact estimation, should g/mi emission rates be used. Direct comparisons of large vehicles to small vehicles in heavy duty use are not advised because this method of expression does not include the social value of the truck. This fact was recognized some years ago in developing test procedures for gasoline and diesel engines in heavy duty use based on power output of the engine, i.e., the brake specific emission rate. Grams per pound of fuel is considered a good means of expression for a given truck or engine or even a group of similarly-powered trucks, such as all gasoline or all diesel, at least for purposes of this project. Dividing emission rates by the amount of fuel consumed penalizes the engine which burns the least fuel. In the case of diesel as compared to gasoline, there is a substantial difference in efficiency; and this difference must be considered when comparing gasoline and diesel emissions on a grams per pound of fuel basis.

Another use of the road results is in understanding the relationship between road emissions and the nine-mode certification test. While no claim is made that the chassis dynamometer nine-mode test gives exactly the same emissions as an engine dynamometer nine-mode test, tests have shown that the results from the chassis test are at least consistent with the engine test stand tests. Thus, for feasibility type studies, changes in the nine-mode emission levels required to produce a desired change in atmospheric emission loading could be estimated.

It is felt that this study, in a limited way, helps to fill the previously existing gap in the information available on precontrolled truck emissions in road operations. As such, the limited analysis done herein should provide a point of departure for those interested in the effects of truck emissions on the environment.

E. VEHICLE OPERATIONAL PERFORMANCE

This section presents the vehicle operational data taken during the road route testing. The vehicle parameters recorded were engine speed in rpm, vehicle speed in mph, engine intake-manifold vacuum in inches of mercury, and throttle position. The comparison of the results from this project with those from previous projects is presented in Part II of this project.

1. Summary of Operational Performance Data

Table 11 presents the average engine speed, average manifold vacuum, and average vehicle speed for each of the ten trucks tested. The individual test results for each truck are presented in Appendix I. In addition to the average values of the parameters measured, the percentage of time spent in various intervals of each parameter are also shown.

For each truck, the run averages, maxima and minima of each parameter is shown in tabular form in Appendix D. The first part of Appendix D summarizes engine speed in 200 rpm increments with percent of time averaged for all runs by all drivers. The next part of Appendix D lists the vehicle speed in 2 mph increments, while the last part of Appendix D is a tabulation on the basis of one inch of mercury intake manifold vacuum increments. Three sets of histograms are included in Appendix E to illustrate these three important parameters that defined the operation of each truck over the road course.

2. Vehicle Speed

From Table 11, it can be seen that the average truck speed during the road test runs had approximately a seven mph range for the trucks tested. Average route speed is one important part of the characterization of the route. The average speed for the ten gasoline powered trucks tested was 20.43 mph.

It might be expected that average route speed would be a function of vehicle size, shape, weight, power to weight, or type of vehicle or its application. As a first look at whether such relationships exist, the average vehicle speed for the ten trucks has been rank ordered in Table 12. Also shown in this table are vehicle test weight, engine CID, and test weight to CID ratio; the latter being a rough indication of weight to power ratio. From the table it appears that if the highest average speed is disregarded, average speed may be a function of test weight or test weight to CID ratio.

In Section D, a correlation matrix was developed for exhaust emissions, as shown in Table 6. The test weight to CID relationship correlation that was also obtained as the result of the matrix format, indicated that there may be a relationship between test weight and CID. Thus, it is not surprising that vehicle speed would be a function of both test weight and the test

TABLE 11. AVERAGE VEHICLE OPERATIONAL PARAMETERS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS OPERATED OVER THE SAN ANTONIO ROAD ROUTE

Truck No.	Engine Make and CID	Model Year	Truck Test Weight, lb	Number of Tests	Average Engine Speed, RPM	Average Manifold Vacuum, in. Hg.	Average Vehicle Speed, miles/hr
G-1	Ford, 330 V8	1967	12,400	8	1502	14.3	21.98
G-2	IHC, 304 V8	1968	14,900	7	1636	12.2	20.07
G-3	Ford, 300 I6	1967	9,140	8	1474	14.6	21.19
G-4	Chevy, 350 V8	1969	13,475	9	1867	14.6	21.36
G-5	Dodge, 318 V8	1967	13,875	6	1576	12.1	21.14
G-6	IHC, 345 V8	1968	18,960	9	1663	11.6	19.50
G-7	Chevy, 292 I6	1965	14,850	8	1672	12.3	24.11
G-8	GMC, 351 V6	1965	15,970	7	1358	12.9	19.16
G-9	Chevy, 366 V8	1966	22,650	9	1451	12.5	16.85
G-10	Ford, 391 V8	1969	28,900	8	1312	12.8	18.97
				Average	1551	13.0	20.43

TABLE 12. RANK ORDER OF TRUCKS BY AVERAGE VEHICLE SPEED
(Lowest to Highest)

Average Vehicle Speed, mph	Vehicle Test Wt., lbs	Engine CID	Wt./CID ratio	Truck Number
16.85	22,650	366 V8	61.88	G-9
18.97	28,900	391 V8	73.91	G-10
19.16	15,970	351 V6	45.50	G-8
19.50	18,960	345 V8	54.96	G-6
20.07	14,900	304 V8	49.01	G-2
21.14	13,875	318 V8	43.63	G-5
21.19	9,140	300 I6	30.47	G-3
21.36	13,475	350 V8	38.50	G-4
21.98	12,400	330 V8	37.58	G-1
24.11	14,850	292 I6	50.86	G-7

weight to CID ratio. To determine the significance of this relationship, a regression analysis was performed for both variables. The results showed that for the limited data available, the test weight to CID ratio seemed to give a better curve fit than test weight alone. The correlation coefficients were -0.76 and -0.74 for weight to CID ratio and test weight, respectively. Figure 15 is a plot of the average vehicle speed as a function of the test weight to CID ratio.

Another part of the route characterization is the percentage of time spent in various speed intervals. The average time in various speed intervals for the ten trucks is shown in tabular form in Table 13 are graphically in Figure 16. As can be seen from these presentations, the average time spent at idle (0-2 mph interval) is 15.0 percent. Aside from idle, no more than approximately 7 percent of the time, on an average, was spent in any other 2-mph interval. The histogram is quite interesting as it shows where vehicle speed maximum and minimum occur.

The use of 2 mph intervals is rather close for this type of work, but it is advantageous for describing the route accurately. Note the maximum is shown in the area of 24 to 26 mph, probably because 30 mph was the posted limit on much of the course. Since the SARR is essentially an urban driving route, it is instructive to compare the results of this study where possible to the EPA Urban Dynamometer Driving Schedule (UDDS) and the LA-4 road course from which the UDDS was developed. Information on the UDDS and LA-4 route was presented in an SAE paper.(7) Table 14 uses the information from that paper to compare these driving schedules to the SARR.

If the assumption is made that all urban traffic is similar, then one of the inferences that might be made from Table 14 is that heavy duty gasoline powered trucks, even semi-trailer rigs, can keep up with urban traffic. The truck's speed is constrained and controlled by prevailing traffic conditions and posted speed limits and not necessarily by limitations of the vehicle's power, etc.

A commonly held view about large trucks in urban operation is that they make, or tend to help make traffic, if for no other reason than their sheer size, shape and volume. The large vehicles occasionally are unable to maneuver through traffic situations. As explained earlier, however, the design of this project intentionally minimized operation during peak traffic and maximized operation during normal work day traffic. The trucks were purposely driven during the day, but not necessarily very early or very late in the day when commuter car traffic is normally at its peak. Generally, trucks are used throughout the day. Therefore, operation during the normal truck working day was considered to be the most representative of truck operation in the urban situation. In the specific case of the operation of these ten trucks, they were definitely able to stay up with prevailing traffic and easily maintain the posted speed limits. They were operated at half payload and accordingly experienced

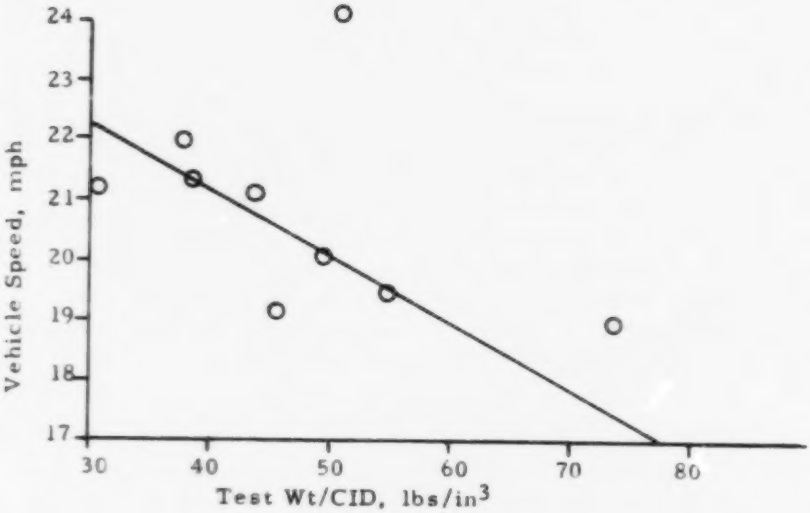


FIGURE 15. RELATIONSHIP BETWEEN VEHICLE TEST WEIGHT/CID RATIO AND AVERAGE VEHICLE SPEED FOR TEN PRECONTROLLED TRUCKS OPERATED OVER THE SARR

TABLE 13. PERCENTAGE OF TIME SPENT IN VARIOUS VEHICLE SPEED INTERVALS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS OPERATED OVER THE SARR

(Averages of Individual Truck Averages)

Speed Interval mph	Average Percent Time in Interval	Maximum Percent Time in Interval	Minimum Percent Time in Interval
0-2	14.7597	20.8100	8.7500
2-4	2.5831	6.8200	1.1800
4-6	2.2460	4.4000	1.1600
6-8	2.5597	4.2000	1.3800
8-10	3.3069	5.4200	1.8400
10-12	4.0360	6.3800	2.0400
12-14	4.7314	8.4000	2.6600
14-16	4.9640	8.1100	2.6500
16-18	5.4266	9.1400	3.8800
18-20	5.7529	9.3900	3.3400
20-22	6.2523	9.7200	3.7400
22-24	6.2623	10.0100	3.0500
24-26	6.2877	9.4500	3.0500
26-28	5.8171	9.4100	1.6400
28-30	5.0074	7.2900	0.9000
30-32	4.0763	7.1900	1.0500
32-34	2.6731	6.2700	0.3100
34-36	1.7669	6.3900	0.3000
36-38	1.3646	5.1100	0.1500
38-40	1.1994	3.1500	0.1500
40-42	1.3314	3.7200	0.2400
42-44	1.5269	4.9400	0.1700
44-46	1.4840	3.2100	0.1900
46-48	1.3871	3.7800	0.0000
48-50	1.1951	3.7800	-0.0000
50-52	0.7743	2.8400	-0.0000
52-54	0.4417	1.5700	-0.0000
54-56	0.1897	1.1200	-0.0000
56-58	0.1034	0.8000	-0.0000
58-60	0.0906	1.5100	-0.0000

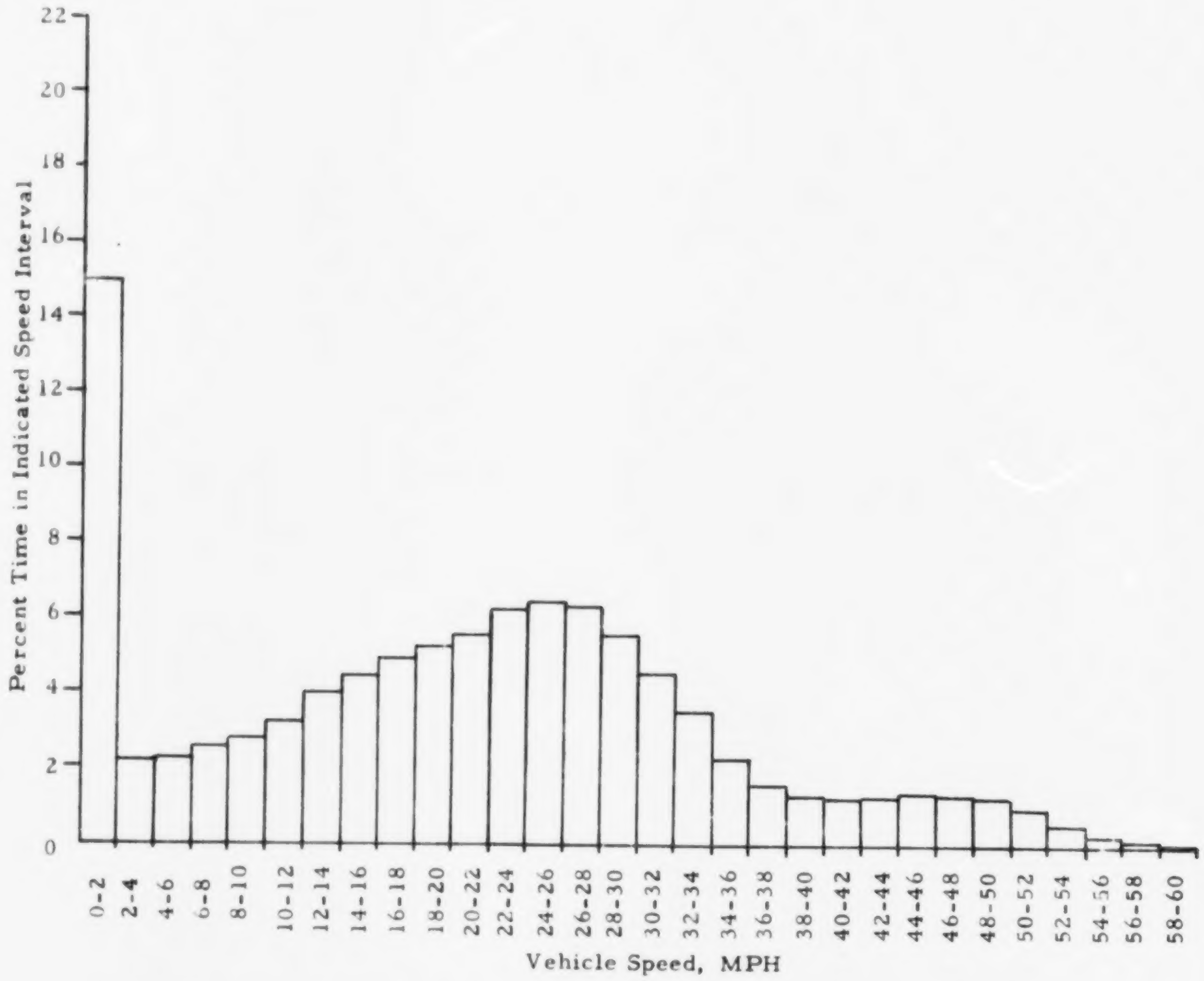


FIGURE 16. AVERAGE PERCENTAGE TIME IN VARIOUS SPEED INTERVALS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS ON THE SARR

TABLE 14. COMPARISON OF SARR WITH URBAN DYNAMOMETER DRIVING SCHEDULE AND LA-4 ROAD COURSE

	SARR (7.24 miles)	UDDS (7.5 miles)*	LA-4 Road Course (12 miles)**
Percent time at idle	15 (gasoline powered trucks)	18.2 (cars)	18.2 (cars)
Average speed	20.4 (gasoline powered trucks)	19.7 (cars)	18.9 (cars)

*From Table 5, Reference 7.
**From Table 1, Reference 7.

more rapid 0-30 mph accels than would have been the case if fully loaded. Trucks operating in and around cities operate neither all full or all empty, so the selection of half payload was certainly justified.

3. Engine Speed

It is difficult to compare average engine speeds from truck to truck. Transmission design affects engine speed for the same engine operating at the same vehicle speed and power requirements. Also, different engines are designed with different operating speed ranges. Nevertheless, it may be instructive to compare the average engine speeds obtained from the road testing from one truck to another and to compare road engine speeds with the nine-mode FTP speed of 2000 rpm for modes 2 through 9. From Table 11, the average engine speed for the ten trucks is 1551 rpm. The average engine speed for the individual trucks ranged from 1312 rpm to 1867 rpm. Note that the road average engine speed is not directly comparable to the nine-mode FTP engine speed for modes 2 through 9, since the road average also contains time at idle. One way to compare would be to calculate a time average nine-mode speed based on the percent time at idle and percent time at 2000 rpm. If this is done, an "average" nine-mode engine speed of 1674 rpm is obtained, assuming an idle speed of 600 rpm.

Again, rank ordering of the test vehicles by average engine rpm is a quick way to detect possible relationships between average engine rpm and other vehicle parameters. Table 15 presents this rank ordering. It appears that none of the engine or vehicle parameters presented with the average engine speed have any direct relationship with the average engine speed. Since there is obviously little relationship between engine speed and the other parameters listed, a regression analysis was not performed. The lack of a relationship between average engine rpm and other vehicle and engine variables reinforces the remarks made at the beginning of this subsection concerning the value of the fleet average engine rpm and

TABLE 15. RANK ORDER OF TEN PRECONTROLLED TRUCKS BY AVERAGE ENGINE SPEED (Lowest to Highest)

Average Engine Speed, rpm	Trans. Type	Vehicle Test Wt., lbs	Avg. Vehicle Speed, mph	Engine CID	Wt./CID ratio	Truck No.
1312	5 Hi-Lo	28,900	18.97	391 V8	73.91	G-10
1358	5 Hi-Lo	15,970	19.16	351 V6	45.50	G-8
1451	4 Hi-Lo	22,650	16.85	366 V8	61.88	G-9
1474	Auto	9,140	21.19	300 I6	30.47	G-3
1502	4 std	12,400	21.98	330 V8	37.58	G-1
1576	5 Hi-Lo	13,875	21.14	318 V8	43.63	G-5
1636	4 std	14,900	20.07	304 V8	49.01	G-2
1663	5 Hi-Lo	18,960	19.50	345 V8	54.96	G-6
1672	4 std	14,850	24.11	292 I6	50.86	G-7
1867	4 std	13,475	21.36	350 V8	38.50	G-4

comparisons of average engine rpm between trucks.

An examination of how engine speed varies during road operation can be made using a histogram showing the average amount of time spent in various increments of engine speed for the ten trucks. Such a histogram is shown in Figure 17. While differences in the engine rpm operating range tend to flatten the distribution somewhat, the most frequent operating speeds can be seen. The most time, approximately 18 percent, is spent at idle (400 to 600 plus 600 to 800 rpm). Note that this is close to the 15 percent time spent at vehicle speeds below two miles per hour. The most time spent, on an average, in any other interval is approximately 12 percent in the 1400 to 1600 rpm interval. However, approximately 44 percent of the time is spent in the broad rpm interval from 1200 to 2000 rpm. Table 16 compares the average time spent in certain time intervals on the road with the time spent at those speeds during the nine-mode FTP.

TABLE 16. COMPARISON OF TIME AT CERTAIN ENGINE SPEEDS FOR ROAD TESTS AND THE NINE-MODE FTP

	Percent of Total Test Time		1970-73
Engine Speed	Road Tests	Nine-Mode FTP*	Weighting Factor
Idle	17.9	23.3	3.6
1800 to 2200 rpm	17.2	76.7	96.4

*The 1974 weighting factors and time in mode are equivalent.

If the San Antonio Road Route can be judged at all typical, it appears that trucks in urban environments spent most of the time at speeds less than the 2000 rpm used in the nine-mode FTP.

4. Engine Intake Manifold Vacuum

The average intake manifold vacuum for each truck tested on the road, as well as the fleet average, is shown in Table 11. The fleet average intake manifold vacuum for the road tests is 13.0 inches of mercury. The average intake manifold vacuum for the individual trucks ranged from 11.6 to 14.6 inches of mercury. While level of intake manifold vacuum is a good indication of percent of maximum power at any speed, different engines may have a different value of manifold vacuum for the same horsepower output at a given engine speed. However, manifold vacuum is one of the variables used to define the various modes of the nine-mode FTP, and hence merits some investigation. Table 17 is the rank ordering of intake manifold vacuum. There is no apparent relationship between intake manifold vacuum and any of the items listed in the table.

To examine the variation in manifold vacuum during the road tests,

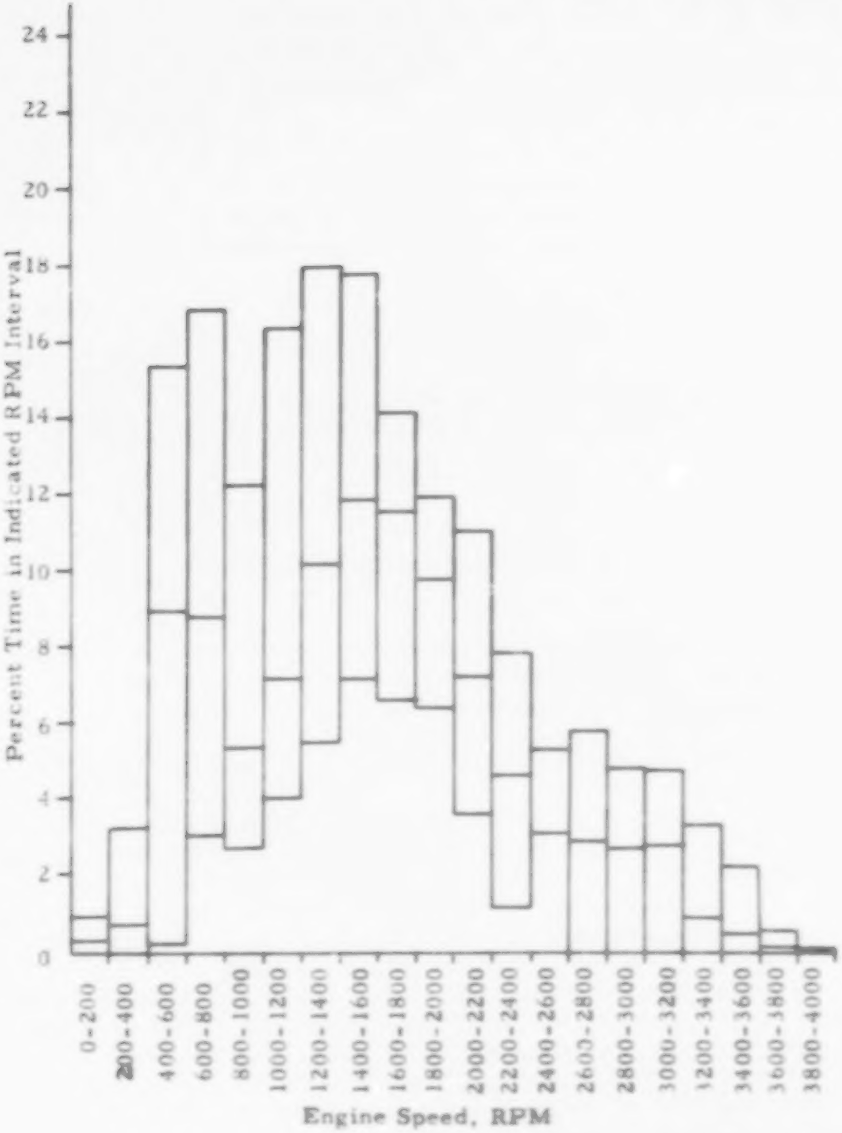


FIGURE 17. AVERAGE PERCENTAGE TIME IN VARIOUS ENGINE SPEED INTERVALS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS ON THE SARR

TABLE 17. RANK ORDER OF TEN PRECONTROLLED TRUCKS BY AVERAGE INTAKE MANIFOLD VACUUM (Lowest to Highest)

Average Intake Manifold Vac., Inches of Hg.	Trans. Type	Vehicle Test Weight, lbs	Average Vehicle Speed, mph	Engine CID	Wt. /CID ratio	Truck No.
11.6	5 Hi-Lo	18,960	19.50	345 V8	54.96	G-6
12.1	5 Hi-Lo	13,875	21.14	318 V8	43.63	G-5
12.2	4 std	14,900	20.07	304 V8	49.01	G-2
12.3	4 std	14,850	24.11	292 I6	50.86	G-7
12.5	4 Hi-Lo	22,650	16.85	366 V8	61.88	G-9
12.8	5 Hi-Lo	28,900	18.97	391 V8	73.91	G-10
12.9	5 Hi-Lo	15,970	19.16	351 V6	45.50	G-8
14.3	4 std	12,400	21.98	330 V8	37.58	G-1
14.6	Auto	9,140	21.19	300 I6	30.47	G-3
14.6	4 std	13,475	21.36	350 V8	38.50	G-4

the average percent of time spent in various increments of manifold vacuum level are shown in Figure 18. The interpretation of this graph is more difficult than the comparable graphs of vehicle speed and engine rpm. Since idle vacuum on the trucks used in this project varied between 16 and 19 inches of mercury, the percent of time at idle vacuum is difficult to determine. It is also difficult to define wide open throttle (WOT) and closed throttle (CT). It would be desirable to compare the percent time at various intake vacuum levels on the road with the time spent (or weighting factor) in each vacuum mode of the nine-mode FTP. To do this the distribution in Figure 18 was divided into six sections to represent the six vacuum modes of the nine-mode FTP. These divisions can be seen in Table 18.

It must be kept in mind that the road route manifold vacuum levels are irrespective of engine speed. For the road data, it is an assumption to define all the time spent at 16 to 19 inches of mercury as idle. Undoubtedly, part of this time is spent at cruising speeds. Therefore, no attempt was made to separate out idle and cruise in the 13 to 20 inches of mercury area. The comparison between the road and nine-mode times at various vacuum levels is shown in Table 18.

TABLE 18. COMPARISON OF TIME AT CERTAIN INTAKE MANIFOLD VACUUM LEVELS FOR THE ROAD TESTS AND THE NINE-MODE FTP

		Percent Time at Condition		
Road Vacuum Interval, In. Hg.	Nine-Mode Vacuum	Road Test	1974 Nine-Mode Test	1970 - 1973 Nine-Mode Wt. Factor, %
Idle (16-19 at idle speed)	Idle		23.3	3.6
18 to 20	19	31	5.7	4.7
13 to 18	16		30.7	35.6
7 to 13	10	15	14.7	25.7
7	3	30	11.3	28.3
20	CT	24	14.3	2.1

While comparisons between the road tests and the nine-mode FTP cannot be made in detail from this data, it does appear that the road tests more closely resemble the 1974 weighting factors than the 1970 to 1973 weighting factors. The road test results appear, in general, to be of the same order of magnitude as the 1974 weighting factors except, possibly, for the cruise (16 inches of mercury) mode.

The road route data taken on magnetic tape could be used to generate more specific comparisons between the road and nine-mode by examining the manifold vacuum at engine speed for each data point, thus separating the idle and cruise conditions in the 15 to 20 inches of mercury area. However, that analysis is far beyond the scope of this project.

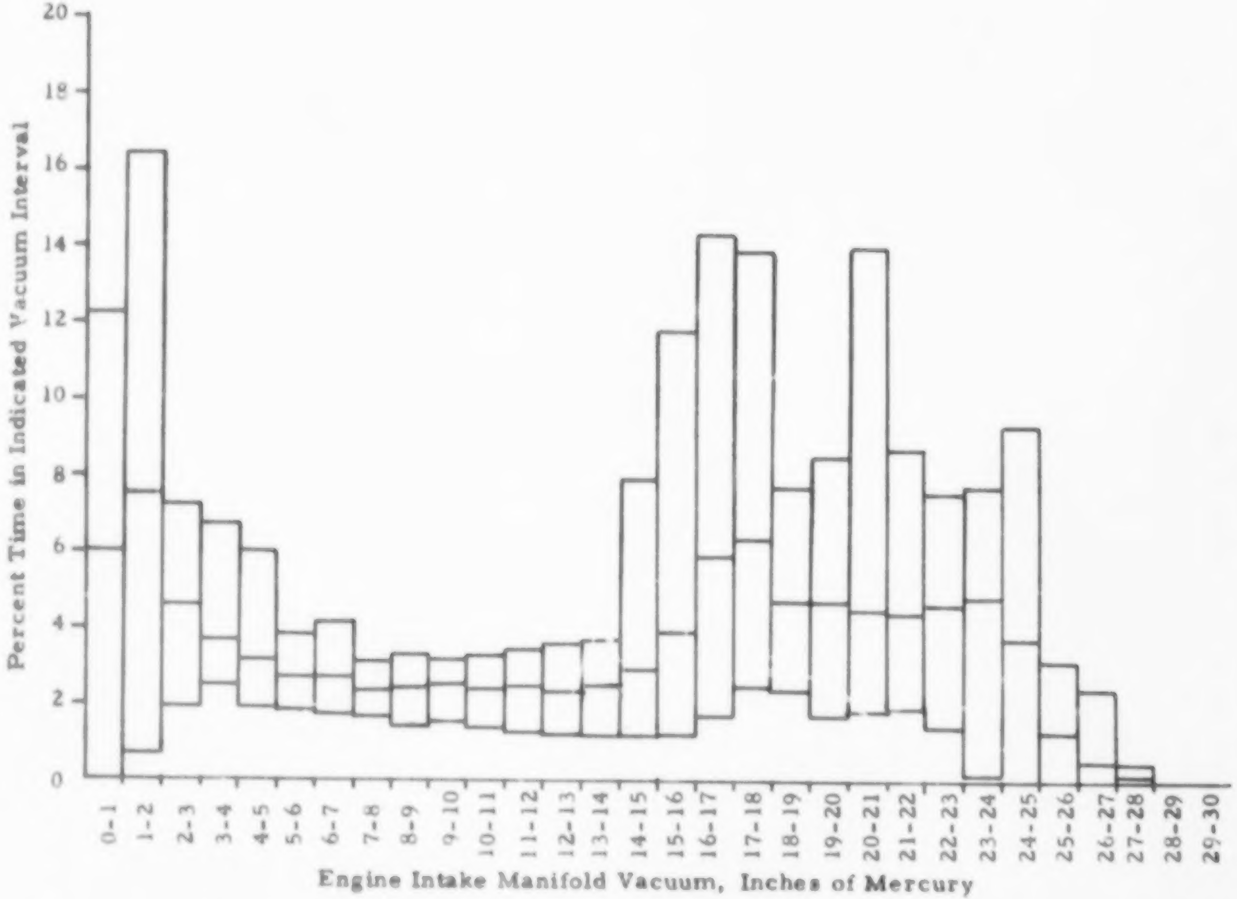


FIGURE 18. AVERAGE PERCENTAGE TIME IN VARIOUS INTAKE MANIFOLD VACUUM INTERVALS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS ON THE SARR

5. Fuel Consumption

As explained in previous sections, total fuel consumed during the road test was measured for each test run. The average fuel consumption for the road tests was shown in Table 4 to be 8.43 lbs, with the average fuel economy being 5.56 miles per gallon. Fuel consumption on the road is of course a function of vehicle test weight, as shown in the rank order listing of fuel consumption in Table 19. Recent light duty vehicle studies have shown that CID also affects fuel consumption. It is of interest, therefore, to observe if the test weight/CID ratio, which roughly represents a weight to power ratio, also has a relationship to fuel consumption. From the table, it can be seen that the relationship between fuel consumption and vehicle test weight or test weight/CID ratio is not perfect. That is, while the fuel consumption is in order lowest to highest, there are two vehicle test weight values, and three ratio values, out of order.

It is hypothesized that the differences in average route speed could be a contributing factor to this lack of correlation. Of course, variations in engine efficiency due to differences in the state of repair of the engine could also be a factor. Nevertheless, there is clearly a relationship between fuel consumption and test weight and test weight/CID ratio. To better define this relationship, a regression analysis was performed for each of the two independent variables. The resulting correlation coefficients were 0.88 for the vehicle test weight and 0.86 for the test weight/CID ratio. Plot of fuel consumption as a function of vehicle test weight, and as a function of test weight/CID ratio are shown in Figures 19 and 20, respectively, with the regression line in each case.

Since fuel consumption was also measured on the nine-mode FTP, the road results can be compared to the nine-mode FTP. This was done in Table 10 of Section D. On the average, the nine-mode FTP fuel consumption was 77 percent of the road test fuel consumption. Figure 21 is a plot of the road fuel consumption and the nine-mode fuel consumption showing the line of one-to-one correspondence and the line of the fleet average comparison ratio of 0.77. The data is fairly well scattered. About the only thing that can be said is that the road fuel consumption was never less than the nine-mode fuel consumption. It is not surprising that the nine-mode fuel consumption and the road fuel consumption show such scatter. The nine-mode procedure is strictly an engine exercise and completely independent of any vehicle variable such as vehicle weight. As has been seen, however, the road fuel consumption is mostly a function of vehicle test weight. Thus, while the road data is useful in fuel studies for trucks, the nine-mode FTP emissions test is of limited usefulness in predicting fuel consumption in actual truck operation.

TABLE 19. RANK ORDER OF TEN PRECONTROLLED TRUCKS BY FUEL CONSUMPTION (Lowest to Highest)

Fuel Consumption lbs/test	Fuel Economy Miles/gal	Vehicle Test Weight lbs	Engine CID	Wt. /CID Ratio	Average Vehicle Speed mph	Truck No.
6.15	7.36	9,140	300 I6	30.47	21.19	G-3
7.09	6.36	12,400	330 V8	37.58	21.98	G-1
7.16	6.59	14,900	304 V8	49.01	20.07	G-2
7.63	5.93	13,475	350 V8	38.50	21.36	G-4
7.71	5.86	13,875	318 V8	43.63	21.14	G-5
8.48	5.35	14,850	292 I6	50.86	24.11	G-7
9.17	4.94	22,650	366 V8	61.88	16.85	G-9
9.53	4.74	15,970	351 V6	45.50	19.16	G-8
10.21	4.44	18,960	345 V8	54.96	19.50	G-6
11.19	4.04	28,900	391 V8	73.91	18.97	G-10

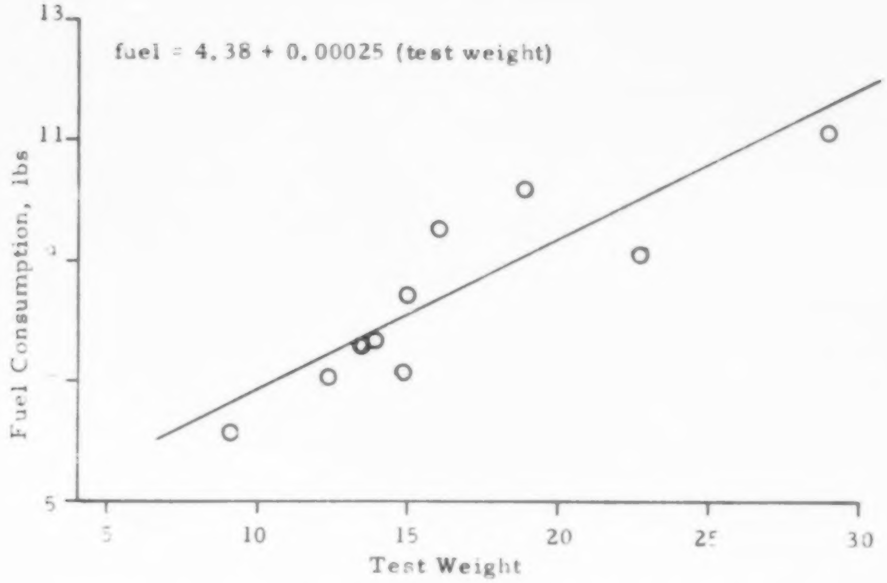


FIGURE 19. RELATIONSHIP BETWEEN ROAD ROUTE FUEL CONSUMPTION AND VEHICLE TEST WEIGHT FOR TEN PRECONTROLLED TRUCKS

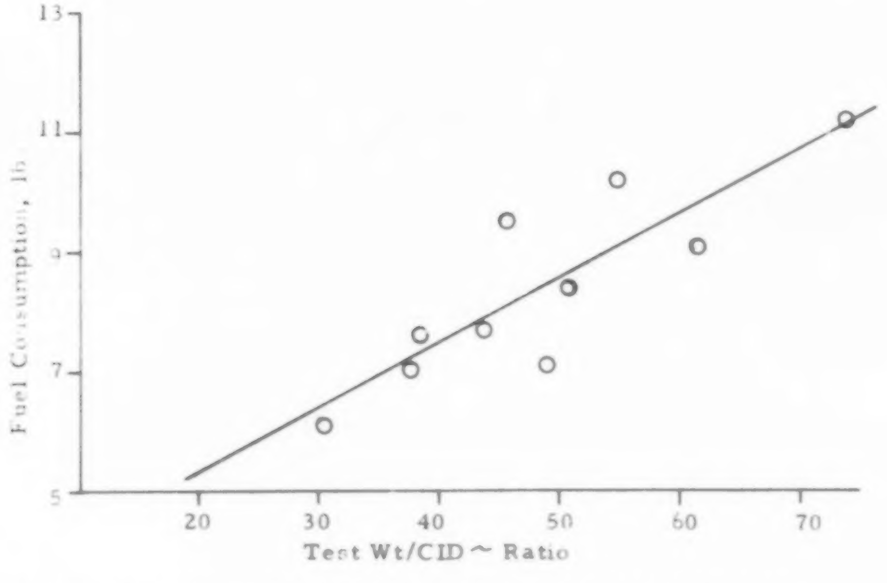


FIGURE 20. RELATIONSHIP BETWEEN ROAD ROUTE FUEL CONSUMPTION AND VEHICLE TEST WEIGHT/CID RATIO FOR TEN PRECONTROLLED TRUCKS

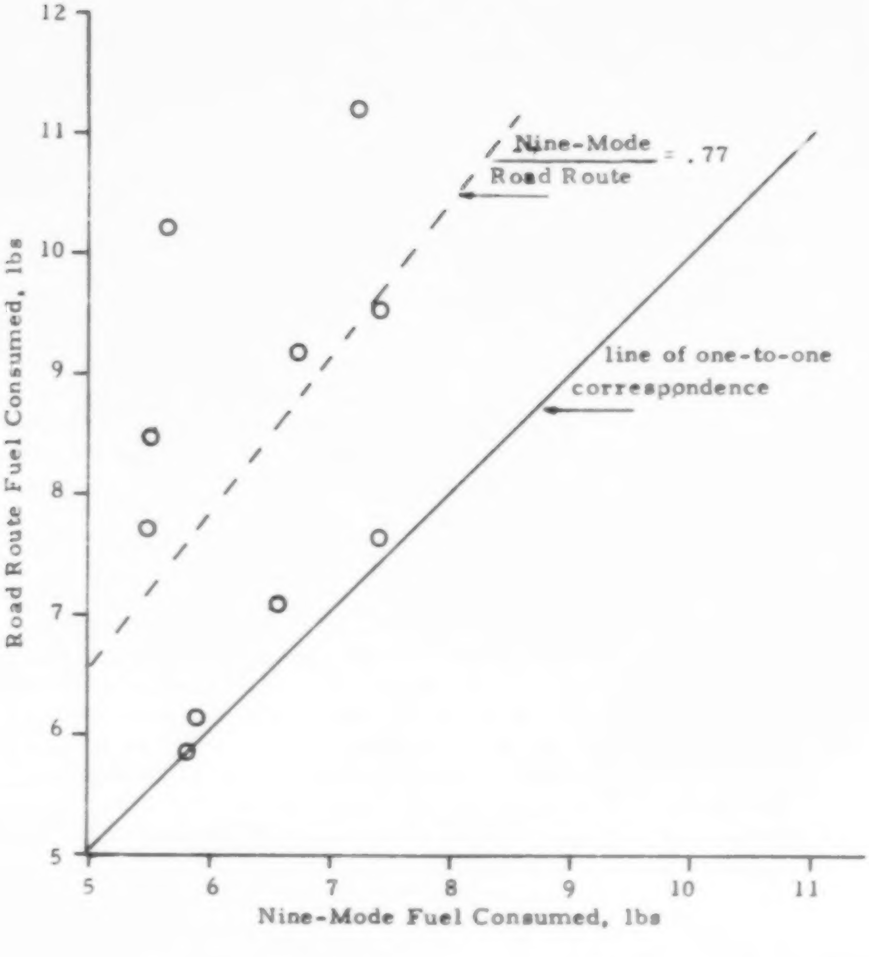


FIGURE 21. RELATIONSHIP BETWEEN ROAD ROUTE FUEL CONSUMPTION AND NINE-MODE FTP FUEL CONSUMPTION

PART II

SUMMARY AND COMPARISON OF ALL GASOLINE AND DIESEL POWERED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE FROM 1971 TO 1975

This part of the report presents the emission results and operational performance from each group of trucks tested on the SARR since 1971. Three groups of trucks have been evaluated. They can be divided according to the type of engine (gasoline or diesel powered) and within the gasoline powered group, by whether or not they were manufactured to meet the 1970 and later standards (controlled and pre-controlled). The 25 emission controlled gasoline trucks were tested under Contract EHS 70-113. The ten diesel powered trucks were evaluated under Contract 68-01-2113. The ten precontrolled gasoline powered trucks were studied under Contract 68-03-0441, for which this report is the final contract report.

Detailed descriptions of the test procedures and results for the 25 controlled gasoline powered vehicles and the ten diesel powered vehicles can be found in their respective final reports(5, 6). The detailed description of test procedures and results of the ten precontrolled trucks may be found in Part I of this report. In all three projects, the same basic approach of road and chassis dynamometer emissions and performance data acquisition was followed.

A. DESCRIPTION OF TRUCKS

The three groups of trucks used for the road route tests were chosen from operating fleets on the basis of model year, manufacturer, engine size, and vehicle GVW. The trucks were not selected on the basis of exhaust emission levels.

An effort was made to select the more popular trucks so as to attempt to approach a sales weighted fleet. However, the limited number of trucks tested in each group precluded this; as did the availability of in-use trucks that could be out of service for two weeks. Other considerations also changed the composition of the test fleet from a purely sales weighted fleet. For instance, in the case of diesels, over 96 percent of the diesel trucks sold are over 26,000-lb GVW(8). However, the desire to compare diesel and gasoline powered trucks of a normal intracity delivery size, led to the decision to include two trucks under 26,000-lb GVW in the diesel test fleet.

To help compare the test fleets to the national sales, Tables 20 and 21 show estimated truck sales for 1971 for gasoline trucks and 1970-1972 for diesel trucks, respectively. Also shown are the test fleet percentages for precontrolled and controlled gasoline trucks, Table 20, and for diesel powered trucks, Table 21.

A description of all trucks tested is shown in Table 22. The trucks are grouped by engine type and emission control system; controlled gasoline powered, uncontrolled gasoline powered, and diesel powered. The gasoline engine maker was in all cases the same as the chassis manufacturer and the conventional engine model designation is by cubic inch displacement (CID) and number of cylinders. The ten diesel trucks were powered by seven normally aspirated engines, three of these were two-stroke design, four were four-stroke. The remaining three engines were turbocharged four-stroke design. All diesel engines had open chamber combustion systems with six of the ten engines employing unit type injectors. Table 23 summarizes some of the truck-to-truck variables by listing the number of trucks in the following categories: number and arrangement of engine cylinders, body style, type of service, and engine manufacturer.

Figure 22 is presented as an aid to understanding the meaning of the results presented in the next two sections. The figure is a plot of the ratio of payload/GVW as a function of GVW for the trucks tested. Payload is defined as GVW (or GCW) minus empty weight (including trailer empty weight for tractor-trailer combinations). The payload/GVW ratio for single bodied gasoline powered trucks varies from 0.3 at 10,000-lb GVW to just over 0.6 at 27,500-lb GVW. The single bodied diesel trucks show a 0.32 ratio at 17,000-lb GVW and a 0.46 ratio at 24,000-lb GVW and appear to have a somewhat lower payload/GVW ratio at the same GVW than the gasoline powered trucks. The payload/GVW ratio for gasoline

TABLE 20. ESTIMATED 1971 GASOLINE POWERED HEAVY DUTY TRUCK SALES

(6000-lb GVW and Over)

Vehicle Manufacturer	Engine CID	Estimated 1971 National Sales, %	Percent of 25 Controlled Truck Fleet	Percent of 10-Truck Precontrolled Fleet (%)
Chev	250	2	-	-
Chev	292	see GMC	see GMC	see GMC
Chev	307	4	-	-
Chev	350	see GMC	see GMC	see GMC
Chev	366	2	4	10
Chev	402	2	-	-
Chev	427	1	4	-
Chrysler	413	2	-	-
Dodge	225	1	-	-
Dodge	318	8	12	10
Ford	240	2	-	-
Ford	300	3	12	10
Ford	302	3	-	-
Ford	330	7	8	10
Ford	360	19	-	-
Ford	361	2	4	-
Ford	390	3	-	-
Ford	391	1	4	10
GMC	292	2*	-	10
GMC	350	19*	12	10
GMC	351	1	4	10
GMC	401	1	-	-
IHC	304	3	8	10
IHC	345	5	12	10
IHC	392	2	-	-
IHC	478	<1	8	-
White	400	<1	8	-
Others		<5	-	-

*Chev and GMC were estimated together

Information taken from Reference 4.

TABLE 21. U. S. DIESEL TRUCK SALES, 1970-1972

Units and Percent by Weight

Class	1972		1971		1970		Test Fleet %
	Units	%	Units	%	Units	%	
0-6,000	0	0	0	0	8	-	-
6,000-10,000	0	0	85	-	417	0.4	-
10,000-14,000	0	0	0	0	0	0	-
14,000-16,000	215	0.2	416	0.4	168	0.2	-
16,000-19,500	41	-	10	-	26	-	10
19,500-26,000	4,789	3.3	5,077	4.5	7,875	7.4	10
26,000-33,000	13,563	9.5	11,269	10.0	11,932	11.3	-
33,000-up	124,481	87.0	96,295	85.1	85,288	80.7	80

Manufacturers Percentage of Market

Make	1972 %	1971 %	1970 %	Test Fleet %
Cummins	33.9	40.3	39.7	30
Det. Diesel	37.2	32.6	28.5	30
Mack	14.8	13.5	15.3	20
Caterpillar	10.5	7.9	8.0	20
IHC	1.9	2.9	2.5	-
Perkins	0.7	1.4	4.0	-
Ford	-	0.1	0.4	-
Other	1.0	1.3	1.6	-

Information taken from "Ward's 1973 Automotive Yearbook".

TABLE 22. DESCRIPTION OF TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

Truck No.	Model Year	Chassis Mfr.	Engine Mfr.	Engine Model	CID	Cyl.	Type of Aspiration	Body Style	Trans-mission	GVW or GCW, lbs	Test Weight	Mileage	Test Start Date
				Controlled Gasoline Powered Trucks									
1	1971	IHC	(Engine Mfr. the same as the Chassis Mfr. in all cases)		345	V-8		Van	4-std	16,000	11,945	8,849	1-27-72
2	1970	Chev			350	V-8		Van	4-std	18,000	13,605	7,155	2-08-72
3	1972	IHC			304	V-8		Van	5-std	19,000	14,530	474	2-22-72
4	1970	Ford			300	I-6		Van	3-auto	10,000	9,740	19,556	3-06-72
5	1970	Chev			350	V-8		Van	4-std	18,000	13,580	16,573	3-22-72
6	1972	Ford			330	V-8		Van	5-std	24,000	17,645	10,032	4-04-72
7	1970	GMC			351	V-6		Stake	4-std	19,500	14,010	31,563	4-13-72
8	1972	Ford			391	V-8		Van	5-std	27,500	19,350	40	4-26-72
9	1972	Ford			330	V-8		Van	5-std	24,000	17,600	8,847	5-04-72
10	1972	Ford			361	V-8		Van	4-std	19,200	14,870	6,180	5-23-72
11	1970	Dodge			318	V-8		Van	4-std	24,000	17,325	41,182	6-06-72
12	1972	IHC			345	V-8		Van	5-std	22,500	16,430	7,376	6-19-72
13	1972	IHC			304	V-8		Van	4-std	17,000	13,275	20,417	7-07-72
14	1972	IHC			345	V-8		Van	5-std	24,500	17,625	2,067	7-17-72
15	1970	Ford			300	I-6		Van	3 auto	10,000	9,590	26,651	7-24-72
16	1970	Ford			300	I-6		Van	3 auto	10,000	9,050	26,428	8-01-72
17	1973	White			400	I-6		Tractor	5 hi-lo	31,000	21,380	38,526	8-22-72
18	1971	IHC			478	V-8		Tractor	5 hi-lo	32,000	23,080	37,043	9-5-72
19	1971	IHC			478	V-8		Tractor	5 hi-lo	32,000	23,075	56,956	9-12-72
20	1970	White			400	I-6		Tractor	5 hi-lo	30,000	20,875	38,496	9-18-72
21	1970	GMC			427	V-8		Tractor	5 hi-lo	32,500	22,290	71,977	9-25-72
22	1971	Chev			350	V-8		Tractor	4-std	24,000	17,165	30,600	10-2-72
23	1969	Dodge			318	V-8		Van	4-std	16,000	12,735	46,235	10-12-72
24	1970	Chev			366	V-8		Stake	5-std	32,000	20,880	5,207	10-20-72
25	1970	Dodge			318	V-8		Van	4-std	24,000	17,065	17,000	11-27-72
				Precontrolled Gasoline Powered Trucks									
G-1	1967	Ford			330	V-8		Van	4-std	17,000	12,400	84,256	7-15-74
G-2	1968	IHC			304	V-8		Van	4-std	18,200	14,900	69,156	7-22-74
G-3	1967	Ford			300	I-6		Van	auto	10,000	9,140	57,686	8-9-74
G-4	1969	Chev			350	V-8		Van	4-std	18,000	13,475	38,795	8-20-74
G-5	1967	Dodge			318	V-8		Stake	5 hi-lo	19,500	13,875	39,005	8-28-74
G-6	1968	IHC			345	V-8		Dump	5 hi-lo	27,500	18,960	56,461	9-9-74
G-7	1965	Chev			292	I-6		Van	4-std	19,500	14,850	46,486	9-16-74
G-8	1965	GMC			351	V-6		Van	5-hi-lo	19,500	15,970	94,552	10-7-74
G-9	1966	Chev			366	V-8		Tractor	4 hi-lo	34,000	22,650	30,471	10-21-74
G-10	1969	Ford			391	V-8		Tractor	5 hi-lo	43,500	28,900	71,581	11-4-74
				Diesel Powered Trucks									
D-1	1972	Ford	Caterpillar	1150	573	V-8	Nat	Van	5-spd	24,000	18,820	33,075	12-11-73
D-2	1970	IHC	Cummins	V903	903	V-8	Nat	Tractor	15-spd	58,000	42,800	295,262	1-17-74
D-3	1971	IHC	Det. Diesel	6-71	426	I-6	Norm	Tractor	10-spd	58,000	41,500	182,320	1-22-74
D-4	1970	White	Cummins	NHC-250	855	I-6	Nat	Tractor	10-spd	58,000	39,490	99,533	2-12-74
D-5	1973	IHC	Caterpillar	1160	636	V-8	Nat	Tractor	5-spd	58,000	37,610	8,741	2-20-74
D-6	1973	Mack	Mack	ENDT 676B	672	I-6	Turb	Tractor	10-spd	72,000	49,460	12,545	3-1-74
D-7	1973	Mack	Det. Diesel	8V-71	568	V-8	Norm	Tractor	10-spd	72,000	50,580	12,499	3-6-74
D-8	1970	Mack	Mack	ENDT 673B	672	I-6	Turb	Tractor	10-spd	58,000	41,090	294,010	3-11-74
D-9	1973	Mack	Cummins	NTC-290	855	I-6	Turb	Tractor	10-spd	72,000	50,980	17,487	3-18-74
D-10	1970	Ford	Det. Diesel	4L-53	212	I-4	Norm	Van	5-spd	17,000	14,430	119,775	3-25-74

TABLE 23. COMPARISONS OF TRUCKS TESTED ON THE S.A.R.R. BY ENGINE, CHASSIS, AND SERVICE

	Gasoline		
	Precontrolled (10 total)	Controlled (25 total)	Diesel (10 total)
Number & arrangement of cylinders			
V-8	7	19	4
V-6	1	1	-
I-6	2	5	5
I-4	-	-	1
Body Style			
Single body van	6	17	2
Single body other than van	2	2	-
Tractor	2	6	8
Type of Service			
Intracity Service	6	20	7
Intracity delivery	1	2	-
Intercity	3	3	3
Engine Manufacturer			
Chevrolet	3	5	
Dodge	1	3	
Ford	3	7	
GMC	1	1	
IHC	2	7	
White	-	2	
Caterpillar			2
Cummins			3
Detroit Diesel			3
Mack			2

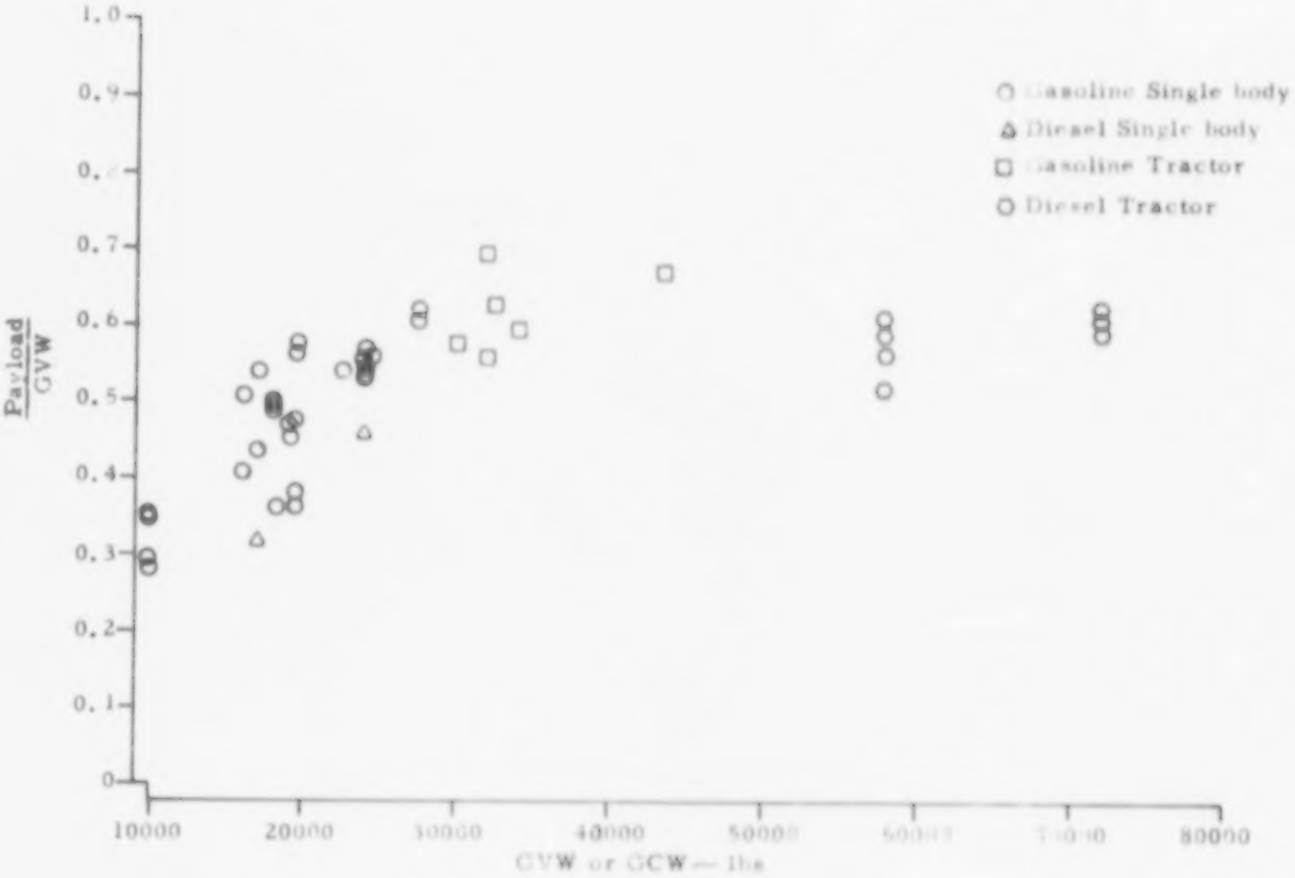


FIGURE 22. RELATIONSHIP BETWEEN GVW (OR GCW) AND PAYLOAD/GVW RATIO FOR TRUCKS TESTED ON THE S.A.R.R.

powered tractors varies from about 0.55 to 0.70, while the ratio for diesel tractors is from approximately 0.52 to 0.62.

Also of interest is the relationship between vehicle GVW and engine power. If it is assumed that engine power output increases as engine displacement (CID), then CID may be used to indicate engine power. A plot of engine CID as a function of GVW is shown in Figure 23. As might be expected, there is a tendency for gasoline engine size to increase as GVW increases, although there is some scatter. For diesel engines, there appears to be little relationship between GVW and engine size, except in the most general way. That is, the smallest CID is at the smallest GVW and the largest GVW does have one of the largest CID engines. In between there is considerable variation evident.

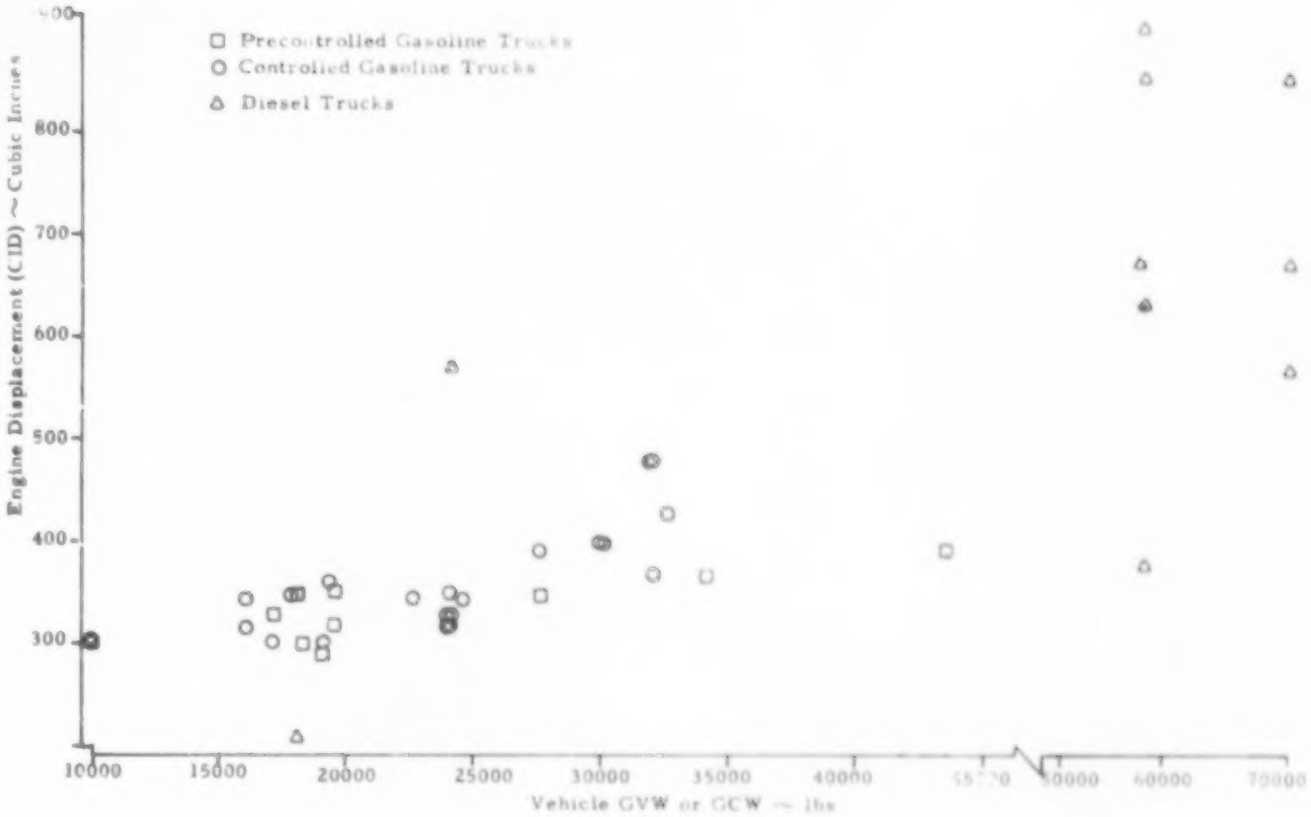


FIGURE 23. RELATIONSHIP BETWEEN GVW (OR GCW) AND ENGINE CID FOR TRUCKS TESTED ON THE S.A.R.A.

B. SUMMARY OF EMISSION RESULTS

This section summarizes the exhaust emissions from the three groups of trucks tested. Both road emission and chassis dynamometer emissions are summarized. The road emissions are presented first, then the chassis dynamometer emissions, then a comparison between the road and dynamometer results. In the following references to individual trucks, vehicle numbers without letter prefixes are controlled gasoline trucks, those with G prefixes are precontrolled gasoline, those with D prefixes are diesels.

1. Summary of Road Emissions

The average emission levels from the road tests for each truck tested are shown in Table 24 in terms of grams per minute, grams per pound of fuel, and grams per mile for the three contaminants measured: HC, CO, NO_x. Examining the results shown in Table 24, it is evident that there is a wide range of emissions rates within each truck group for any emission type.

The maximum average HC level found on any of the road tests was from truck number G-8, a 1965 GMC van with a 351 CID V6 engine. The average HC emissions from this truck were 31.35 g/min, 76.15 g/lb of fuel, and 100.2 g/mile. The minimum HC emissions were, as expected, obtained from the diesel truck tests. Truck D-6, a 1973 Mack tractor powered by a Mack ENDT 676B engine, with HC emissions of 0.47 g/min, 0.98 grams/lb of fuel and 1.46 grams/mile had the lowest truck average HC levels obtained from the road tests.

The maximum average CO level found from the road route tests was from two different trucks depending on how the CO emission level was expressed. If the emission levels were expressed in g/min or g/mile, then truck number 21, a 1970 GMC tractor with a 427 CID V8 engine, with 172 g/min and 542 g/mile had the highest CO emissions. For the CO emissions expressed in g/lb of fuel, the maximum CO level of 377 g/lb of fuel was obtained from truck number 23, a 1969 Dodge van with a 318 CID V8 engine. As expected, the diesel test fleet had the minimum CO level. Two different trucks had minimum CO values, depending on the mode of expressing the emission levels. For CO expressed in terms of g/min or g/mile, the minimum CO values of 2.39 g/min and 7.40 g/mile were obtained from truck D-1, a 1972 Ford van powered by a Caterpillar 1150 engine. In terms of g/lb of fuel, the minimum CO level was 7.71 g/lb of fuel from truck D-8, a 1970 Mack tractor powered by a Mack ENDT 673B engine.

The diesel powered trucks had the maximum average NO_x emission level obtained from the road tests. Truck D-8, with average NO_x emission levels of 9.30 g/min, 20.97 g/lb of fuel and 28.16 g/mile had the highest NO_x emissions. Truck 23, with average NO_x emissions of 0.67 g/min, 1.66 g/lb of fuel and 2.01 g/mile had the lowest NO_x emissions of all trucks tested. It is interesting to note that, in terms of g/lb of fuel, truck 23 had the lowest NO_x emissions and the highest CO emissions.

TABLE 26. TRUCK EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE TESTS

Truck No.	Test Weight	Road Emissions, g/min			Road Emissions, g/lb of fuel			Road Emissions, g/mile			Fuel, lbs
		HC	CO	NO_x	HC	CO	NO_x	HC	CO	NO_x	
Controlled Gasoline Powered Trucks											
1	11,945	5.12	46.50	1.53	10.04	145	14.99	9.06	131	13.52	6.52
2	11,605	2.45	41.27	2.93	6.91	118	8.37	7.14	122	5.64	7.47
3	14,510	3.84	53.90	2.57	17.02	180	8.74	12.33	170	8.28	6.95
4	9,760	1.64	24.71	4.17	5.82	87	19.11	4.91	74	16.04	6.39
5	15,580	2.75	56.41	2.96	8.06	166	8.64	8.05	165	8.61	7.22
6	17,645	5.67	66.89	5.75	16.91	122	16.05	16.67	157	15.60	8.95
7	16,510	6.06	97.00	1.29	17.90	285	3.79	18.75	288	3.84	7.36
8	11,750	7.62	62.96	4.99	19.61	162	11.40	22.91	189	12.94	8.44
9	15,600	6.08	47.14	4.53	15.91	119	12.41	16.78	124	11.07	7.62
10	14,575	4.77	51.12	4.47	12.88	140	12.18	13.28	144	12.56	7.45
11	17,125	5.87	51.41	4.08	15.91	141	11.07	16.64	147	11.58	7.54
12	16,430	5.04	76.48	2.51	15.17	192	6.29	16.89	214	7.00	8.55
13	13,275	3.87	47.15	3.74	12.90	155	11.25	11.78	136	9.76	6.29
14	17,425	4.16	51.61	2.51	13.14	159	6.27	12.35	154	6.97	6.02
15	9,360	1.16	32.04	3.81	3.73	102	12.80	3.22	90	10.83	6.18
16	9,050	1.57	10.96	3.99	5.61	39	14.27	4.48	32	11.39	5.76
17	21,380	10.35	119.05	2.50	23.86	271	5.71	12.05	363	7.72	9.70
18	23,085	13.81	123.09	1.48	26.52	266	7.10	40.95	379	11.02	11.26
19	23,075	7.61	56.11	6.41	15.96	118	13.46	21.98	163	15.50	9.97
20	20,675	7.16	51.66	4.84	17.13	126	11.50	22.31	161	14.91	9.39
21	22,290	9.93	172.90	1.92	17.91	310	3.25	11.50	562	5.68	12.66
22	27,265	8.71	97.00	2.93	18.77	209	6.32	24.59	273	7.91	9.49
23	12,735	5.61	156.00	0.67	13.54	377	1.66	16.96	473	2.01	9.08
24	25,860	4.91	67.61	1.47	11.56	107	8.16	14.86	164	10.51	9.33
25	17,065	9.78	69.43	4.46	24.18	172	11.01	27.99	199	12.73	6.11
Avg.		5.74	67.13	3.16	14.75	169	9.76	17.08	201	10.48	[illegible]
Precontrolled Gasoline Powered Trucks											
G-1	12,400	8.41	93.02	2.09	24.46	250	6.05	23.92	237	5.93	7.09
G-2	14,900	7.27	76.25	1.85	22.28	235	5.85	21.20	225	5.54	7.16
G-3	9,140	3.61	73.66	2.79	11.91	243	8.99	10.10	206	7.56	6.15
G-4	13,475	11.98	81.34	2.21	29.53	206	5.58	31.16	217	5.90	7.51
G-5	13,875	9.42	100.35	1.19	26.38	257	3.04	25.67	273	3.23	7.71
G-6	18,960	5.98	75.20	2.52	12.29	154	5.15	17.31	217	7.26	10.21
G-7	14,850	7.44	120.65	1.23	15.74	271	2.77	19.62	318	3.25	8.48
G-8	15,970	31.35	77.85	2.12	76.15	189	5.17	100.20	249	6.80	9.53
G-9	22,650	25.84	55.97	3.72	66.98	145	9.66	83.78	181	12.09	9.17
G-10	28,900	6.41	80.99	3.26	13.42	167	6.80	20.79	261	10.51	11.19
Avg.		11.76	82.53	2.29	29.79	212	5.90	35.38	238	6.81	8.43
Diesel Powered Trucks											
D-1	18,820	1.96	2.39	3.09	6.97	8.42	10.98	6.09	7.40	9.61	6.36
D-2	42,800	1.26	4.27	5.99	2.58	8.93	12.56	3.85	13.29	18.64	19.80
D-3	41,500	0.47	25.06	5.20	1.13	60.30	12.50	1.46	78.46	16.33	9.82
D-4	35,490	[illegible]	4.51	4.80	1.71	9.46	10.07	2.53	13.94	14.81	11.09
D-5	37,610	1.30	3.65	4.37	3.26	9.13	10.95	3.98	11.20	13.41	9.27
D-6	49,460	0.47	4.32	6.59	0.98	9.04	13.75	1.46	13.48	20.52	11.27
D-7	50,580	0.90	8.76	9.26	1.57	15.25	16.06	2.75	26.64	28.09	13.24
D-8	61,090	2.97	5.41	9.30	6.71	7.71	20.97	9.01	10.36	28.16	10.14
D-9	50,980	0.99	6.58	8.60	1.58	10.48	13.70	2.95	19.60	25.63	14.12
D-10	14,430	0.98	13.00	3.89	3.55	47.57	14.08	3.06	40.86	12.10	6.53
Avg.		1.21	7.59	6.11	3.01	18.63	13.57	3.72	23.52	18.74	10.26

Note: Regarding emissions in grams per pound of fuel, caution should be used in comparing gasoline and diesel-powered vehicles, due to differences in their engine efficiencies.

while truck D-8 had the lowest CO emissions and the highest NO_x emissions.

For the precontrolled gasoline powered trucks, the maximum HC emission level expressed in grams/min was 9 times the minimum level; for HC emissions in grams/lb of fuel, the maximum was 6 times the minimum; and for the HC levels in terms of grams per mile, the maximum level was 10 times the minimum level. The maximum CO emission levels from the precontrolled trucks were twice the minimum level regardless of the mode of expressing the emissions. The maximum NO_x level was 3 times the minimum level for the emission expressed in g/min and g/lb of fuel and 4 times the minimum level for the emissions expressed in grams/mile.

For the controlled gasoline powered trucks, the maximum HC emission level in g/min was 11 times the minimum level. In terms of g/lb of fuel, the maximum HC level was 7 times the minimum and in terms of g/mile, the maximum was 13 times the minimum HC level. The maximum CO emission level for the controlled trucks was 16 times the minimum level expressed in g/min, 10 times the minimum expressed in g/lb of fuel, and 9 times the minimum level expressed in g/mile. It is interesting to note that both the CO and NO_x ranges from the controlled trucks are significantly larger than the same ranges from the uncontrolled trucks. However, the small size of the precontrolled test fleet makes it difficult to determine the cause of the range variation without further statistical analysis.

The diesel truck maximum HC emission level was 6 times the minimum level expressed in g/min, 7 times the minimum level in terms of g/lb of fuel, and 6 times the minimum in g/mile. The maximum CO emission level for diesel trucks was 10 times the minimum in g/min, 8 times the minimum in g/lb of fuel, and 11 times the minimum in g/mile. The maximum NO_x emission level from the diesel trucks is 3 times the minimum expressed in g/min, twice the minimum in g/lb of fuel and 3 times the minimum in g/mile.

To facilitate comparison between the precontrolled gasoline powered trucks, the controlled gasoline powered trucks, and the diesel powered trucks, the emissions in g/lb of fuel have been plotted as histograms in Figures 24 and 25. In addition to the overall average emissions of HC, CO, and NO_x for each group of trucks tested, the three groups have been subdivided into three weight categories. The categories were based on GVW. Trucks with 10,000-lb or less GVW were defined as "small", the "intermediate" group included 16-32,000-lb GVW single body trucks and the "large" group consisted of all the tractor-trailer combinations (24,000 to 72,000-lb GCW). Most of the gasoline trucks tested were in the intermediate category, while most of the diesel trucks tested were in the large category. The histograms show plainly that the overall CO and HC levels of the precontrolled gasoline powered trucks were higher than the controlled

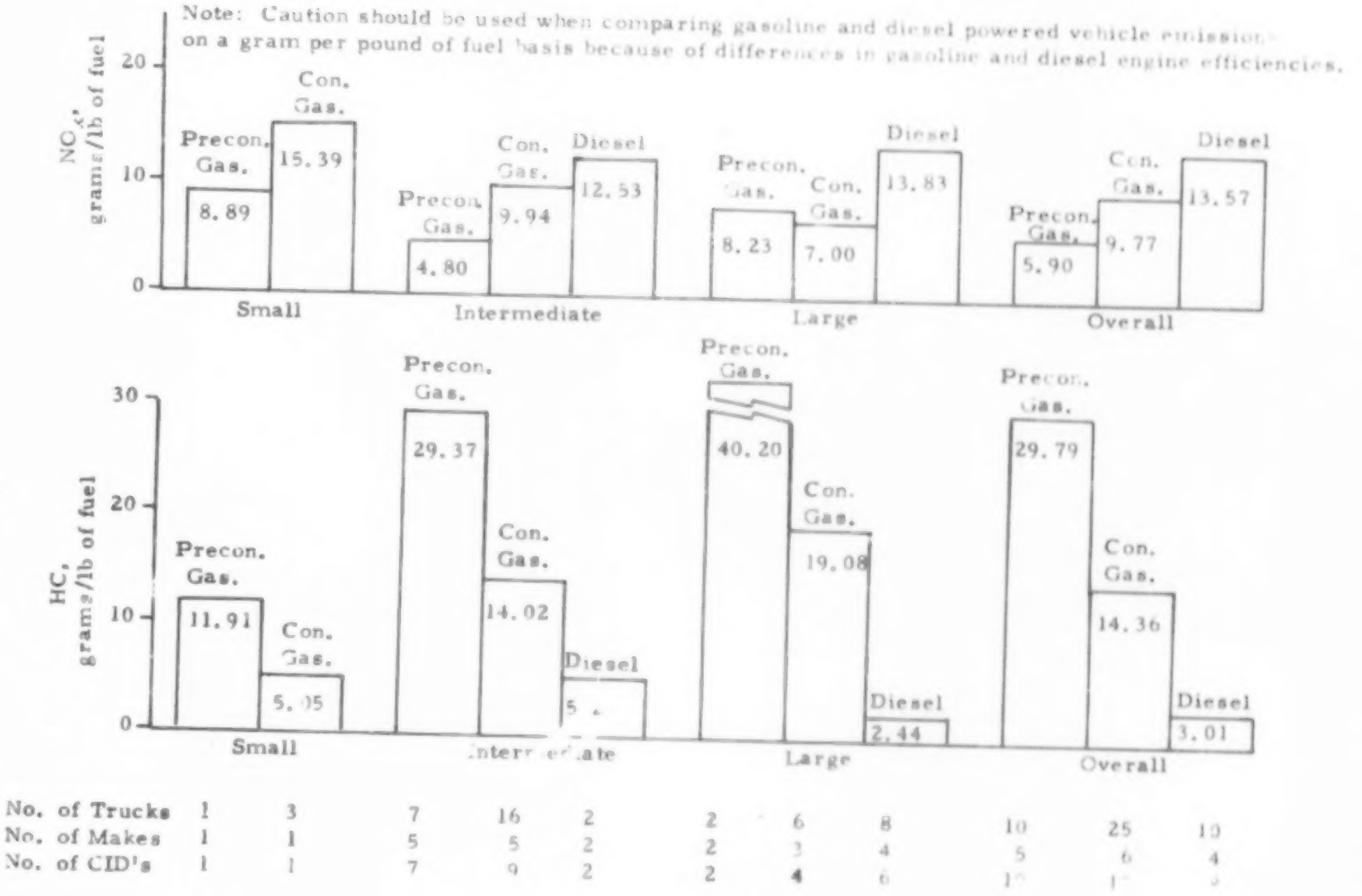
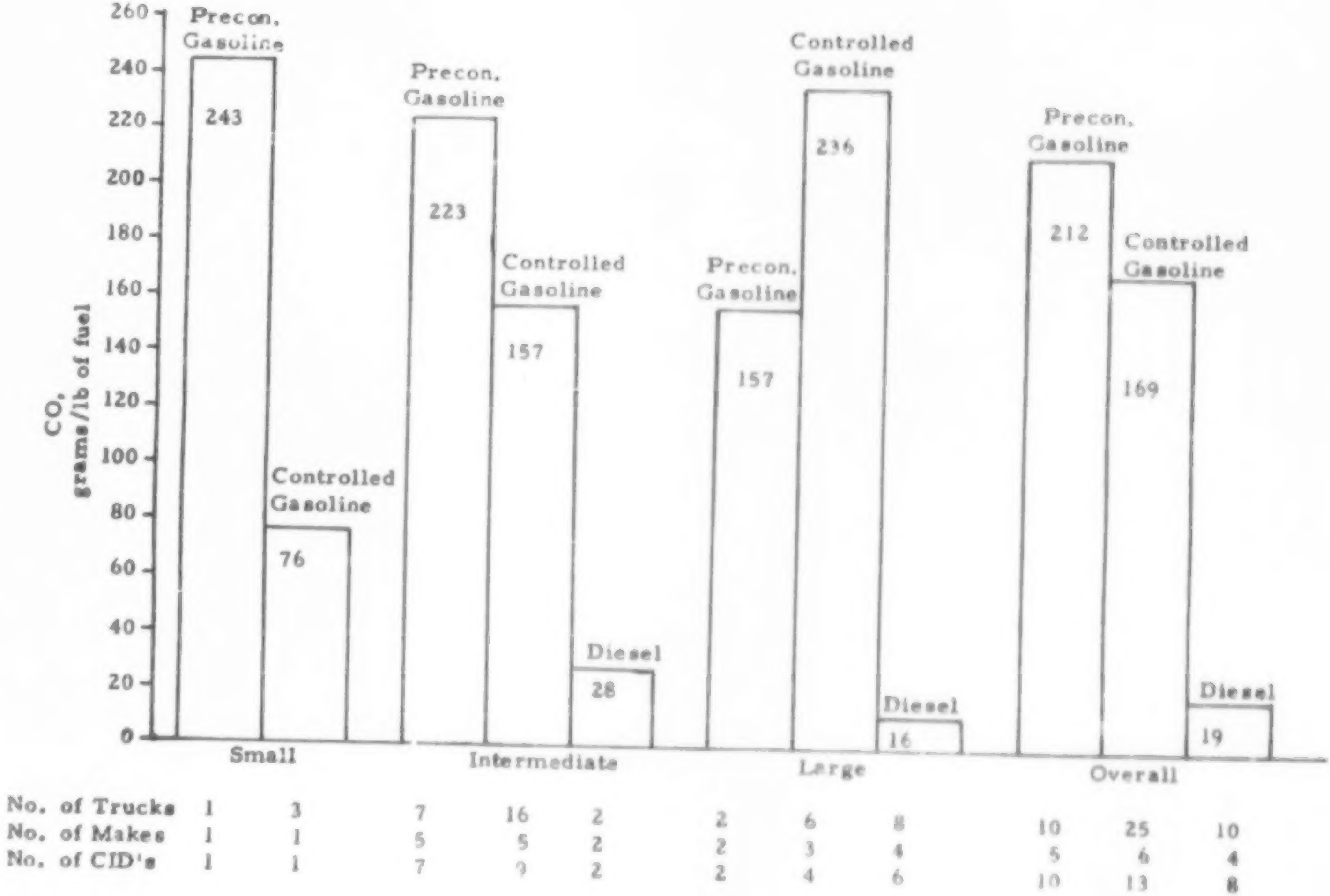


FIGURE 24. COMPARISON OF SARR HC AND NO$_x$ EMISSIONS IN GRAMS PER POUND OF FUEL FOR DIESEL AND GASOLINE TRUCKS



Note: Caution should be used when comparing gasoline and diesel powered vehicle emissions on a grams per pound of fuel basis because of differences in gasoline and diesel engine efficiencies.

FIGURE 25. COMPARISON OF SARR CO EMISSIONS IN GRAMS PER POUND OF FUEL FOR DIESEL AND GASOLINE TRUCKS

gasoline trucks, while precontrolled truck NO_x levels were lower than the controlled truck NO_x levels. It should be noted in passing that the controlled trucks were all 1970 to 1972 models and that there were no NO standards for these model years.

The comparison between gasoline and diesel emissions can also be seen from these histograms. Overall, the diesel trucks produced approximately one-tenth the HC of the precontrolled gasoline trucks and one-fifth the HC emissions of the controlled gasoline trucks. The overall diesel CO emissions were also about 9 percent of the precontrolled gasoline truck CO emissions and approximately 11 percent of the controlled truck CO emissions.

Expressing the road emissions in g/lb of fuel is compatible with the idea of emissions per unit of useful work (brake specific emission rate) which allows comparison of engines of different sizes. This method of expression is also a practical emission expression for both road and chassis dynamometer tests, allowing comparison between the two types of tests. However, since there is a known difference between diesel and gasoline fuel economy, due to differences in engine efficiencies, and hence pounds of fuel used, a different method of expressing emissions may be more meaningful.

It would also be helpful to have an expression of emissions that would include an expression of the truck's value to society, that is, the amount of useful work the truck does by moving goods and services over the road. One way to do this would be to express the emissions in grams per ton-mile. The "ton" in the expression could be GVW, payload or loaded weight. Of the three weights, payload and loaded weight have been chosen to illustrate this method of expressing emissions. Table 25 shows the road emission results in terms of grams per ton-mile based on both test load and test weight for the three groups of trucks tested. Also shown are the test load and test weight for each truck.

While the grams per ton-mile are shown based on both test load and test weight, only the emissions based on test weight will be discussed in this report. The average precontrolled gasoline truck HC emission level was 2.2 times the controlled gasoline truck average HC emission level, and 18 times the average diesel HC emission value. The average precontrolled gasoline truck CO emissions are 1.3 times the controlled gasoline truck average CO emissions and 21.1 times the diesel CO emissions. The average precontrolled gasoline truck NO_x emissions were 0.61 times the controlled trucks NO_x emissions and 0.85 times the diesel NO_x emissions.

To better visualize the comparisons between the groups of trucks, the emissions in g/ton-mile have been plotted in histogram form in Figures 26 and 27. Figure 26 presents the HC and NO_x emissions and Figure 27 the CO emissions. Also shown on these figures are the g/ton-mile for the

TABLE 25. ROAD TEST EXHAUST EMISSIONS FROM TRUCKS TESTED ON THE SAN ANTONIO RCAD ROUTE

(grams per ton-mile)

Truck No.	Engine Mfr.	CID	Test Load	Test Weight	Emissions Based on Test Load* g/ton-mile			Emissions Based on Test Weight** g/ton-mile		
					HC	CO	NO_x	HC	CO	NO_x
Controlled Gasoline Powered Trucks										
1	IHC	345	4055	11,945	4.47	64.61	6.67	1.52	21.93	2.26
2	Chev	350	4395	13,605	3.25	55.52	4.02	1.05	17.94	1.30
3	IHC	304	4470	14,530	5.52	76.06	3.70	1.70	21.40	1.14
4	Ford	300	2570	9,740	3.82	57.39	12.48	1.14	17.19	3.74
5	Chev	350	4420	13,580	3.65	74.66	3.90	1.19	24.30	1.27
6	Ford	330	6355	17,645	5.25	43.11	4.94	1.89	15.53	1.78
7	GMC	351	5490	14,010	6.58	104.90	1.40	2.58	41.11	0.55
8	Ford	391	8350	19,150	5.49	45.27	3.09	2.39	19.74	1.35
9	Ford	330	6400	17,600	5.24	38.75	4.08	1.91	14.09	1.49
10	Ford	361	4330	14,870	6.13	66.51	5.79	1.79	19.37	1.69
11	Dodge	318	6675	17,325	4.96	44.04	3.47	1.92	16.97	1.34
12	IHC	345	6070	16,430	5.57	70.51	2.31	2.06	26.05	0.85
13	IHC	304	3725	13,275	6.00	73.02	5.25	1.68	20.49	1.47
14	IHC	345	6875	17,625	3.59	44.80	2.02	1.40	17.48	0.79
15	Ford	300	2570	9,590	2.51	69.84	8.43	0.76	21.10	2.55
16	Ford	300	2570	9,050	3.49	24.58	8.86	1.09	7.67	2.77
17	White	400	8620	21,380	7.44	84.22	1.79	3.00	33.96	0.72
18	IHC	478	8920	23,080	9.19	84.98	2.47	3.55	32.84	0.96
19	IHC	478	8925	23,075	4.93	36.53	4.14	1.91	14.13	1.60
20	White	400	8125	20,875	5.49	39.63	3.67	2.14	15.42	1.43
21	GMC	427	10210	22,290	6.13	106.17	1.11	2.81	48.63	0.51
22	Chev	350	6835	17,165	7.20	79.88	2.31	2.86	31.81	0.92
23	Dodge	318	3265	12,735	10.39	289.73	1.23	2.66	74.28	0.32
24	Chev	366	11120	20,880	2.67	25.90	1.89	1.42	13.79	1.01
25	Dodge	318	6035	17,065	9.28	65.95	4.22	3.28	23.32	1.49
		Average			5.53	70.66	4.13	1.99	24.50	1.41
Precontrolled Gasoline Powered Trucks										
G-1	Ford	330	4600	12,400	10.40	103.1	2.58	3.86	38.26	0.96
G-2	IHC	304	3330	14,900	12.73	133.9	3.33	2.85	29.95	0.74
G-3	Ford	300	2570	9,140	7.86	160.5	5.88	2.21	45.14	1.65
G-4	Chev	350	4525	13,475	13.77	95.9	2.61	4.63	32.19	0.88
G-5	Dodge	318	5625	13,875	9.12	97.2	1.15	3.70	39.41	0.47
G-6	IHC	345	8540	18,960	4.05	50.9	1.70	1.83	22.93	0.77
G-7	Chev	292	4650	14,850	8.44	136.7	1.40	2.64	42.82	0.44
G-8	GMC	351	3540	15,970	56.61	140.7	3.84	12.55	31.18	0.85
G-9	Chev	366	8930	22,650	47.33	40.6	2.71	7.40	16.00	1.07
G-10	Ford	391	14600	28,900	2.85	35.8	1.44	1.40	18.1	0.73
		Average			17.32	99.5	2.66	4.31	31.60	0.86
Diesel Powered Trucks										
D-1	Caterpillar	573	5860	18,820	2.93	2.52	3.28	0.65	0.79	1.02
D-2	Cummins	903	15270	42,800	0.50	1.74	2.44	0.18	0.62	0.87
D-3	Det. Diesel	426	16390	41,500	0.18	9.57	1.99	0.07	3.78	0.79
D-4	Cummins	855	15120	39,490	0.33	1.84	1.96	0.13	0.71	0.75
D-5	Caterpillar	636	15120	37,610	0.53	1.48	1.77	0.21	0.60	0.71
D-6	Mack	672	22370	49,460	0.13	1.21	1.83	0.06	0.55	0.83
D-7	Det. Diesel	568	22270	50,580	0.25	2.39	2.52	0.11	1.05	1.11
D-8	Mack	672	17320	41,090	1.04	1.20	3.25	0.44	0.50	1.37
D-9	Cummins	855	22270	50,980	0.26	1.76	2.30	0.12	0.77	1.01
D-10	Det. Diesel	212	2860	14,430	2.14	28.57	8.50	0.42	5.66	1.69
		Average			0.83	5.22	2.98	0.24	1.50	1.01

*Test Load = (GVW - Empty Weight)/2

**Test Weight = Empty weight + Test load

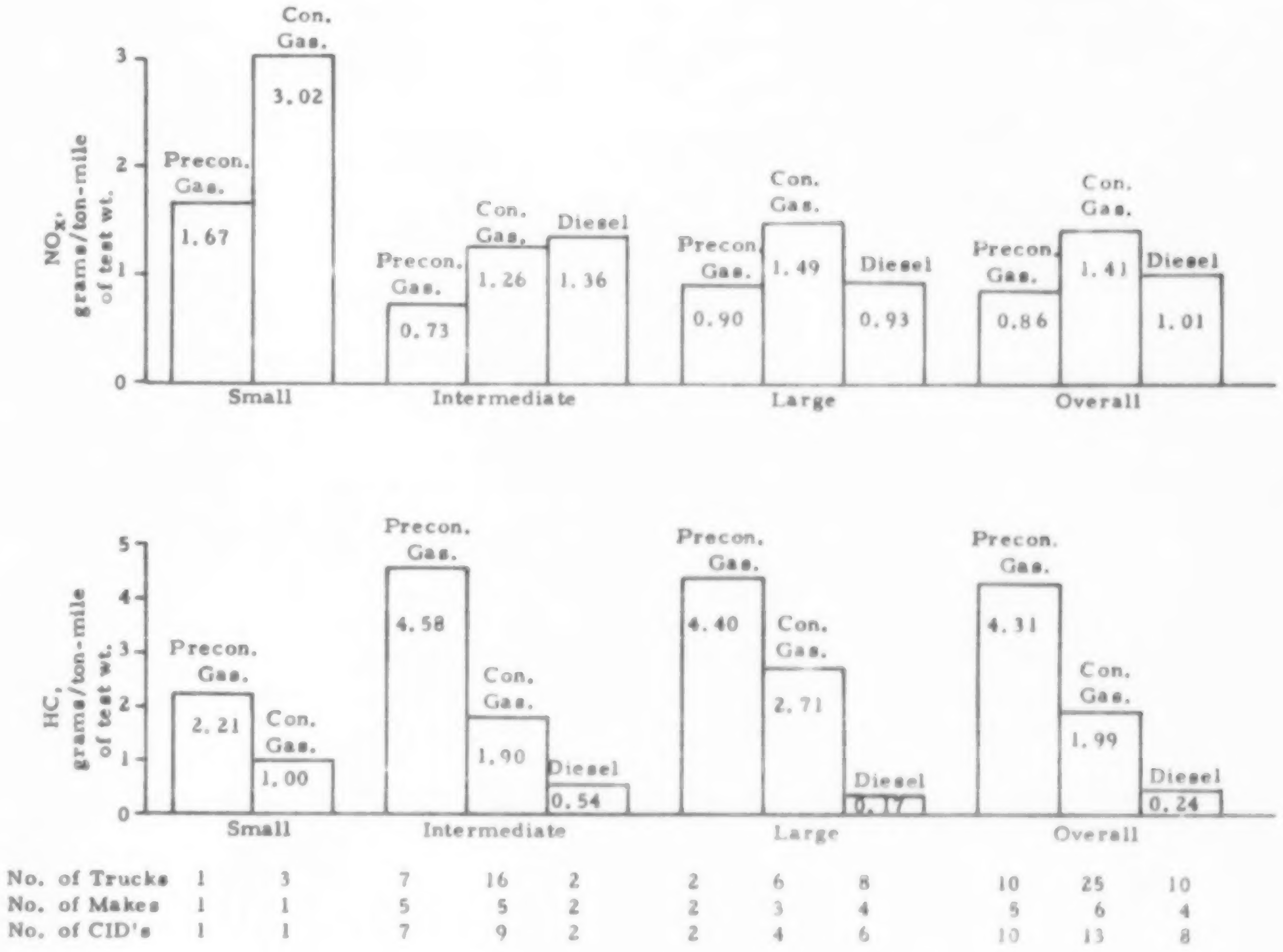


FIGURE 26. COMPARISON OF SARR HC AND NO_x EMISSIONS IN GRAMS PER TON-MILE FOR DIESEL AND GASOLINE TRUCKS

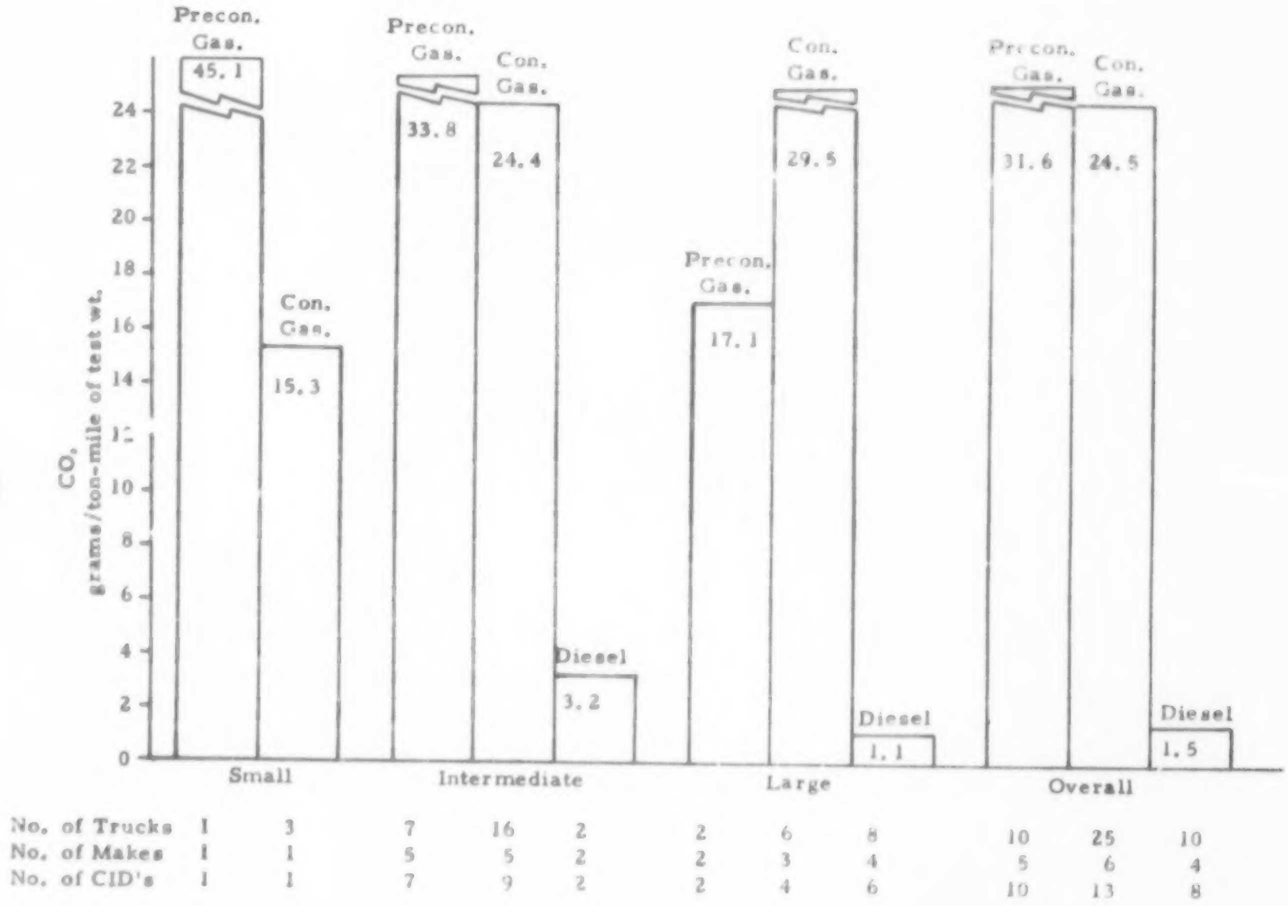


FIGURE 27. COMPARISON OF SARR CO EMISSIONS IN GRAMS PER TON-MILE FOR DIESEL AND GASOLINE TRUCKS

small, intermediate, and large weight groupings used in Figures 24 and 25. As can be seen by comparing Figures 26 and 27 with Figures 24 and 25, expressing emissions in grams per ton-mile tends to remove some of the emission differences seen between weight groups. The small number of trucks in each of the size groups makes it difficult to compare emissions between groups and the conclusions about relationships between size groups made in the discussion that follows should be regarded only as tentative. The purpose of the discussion is to point out the benefits of the grams/ton-mile method of expressing emissions and to compare the gasoline and diesel powered trucks by this method.

Looking first at the NO_x emissions, Figure 24 shows the NO_x emissions in grams/lb of fuel decreasing as the vehicle weight class increases for the controlled gasoline trucks and increasing slightly as vehicle weight increases for diesel trucks. When the NO_x emissions are expressed in grams per ton-mile, the opposite trend is found, at least for the intermediate and large size groups. The diesel NO_x emissions in each size category (except small, which contained no diesels) when expressed in grams/lb of fuel were higher than the gasoline NO_x emissions in the same category. However, when expressed in grams/ton-mile, the diesel NO_x emissions for the large size group and the overall average are lower than the gasoline NO_x emissions. In the intermediate class, the average test weight of the trucks from both the diesel and gasoline fleets are more nearly equal than in the large class. Thus the differences in the two methods of expressing emissions can best be seen in the intermediate class. In terms of grams/lb of fuel, the average NO_x emission level from the diesel trucks in the intermediate category is approximately 25 percent higher than the gasoline truck level. When the NO_x level is expressed in grams/ton-mile, the diesel emission level is only 8 percent higher than the gasoline trucks. This clearly shows how better fuel economy can indicate poorer emissions when the emissions are expressed in grams/lb of fuel than is the case when expressed in grams/ton-mile. Thus it appears that the best way to compare the fleet average emissions is using grams/ton-mile. On this basis, the average diesel-powered trucks' NO_x emission level is approximately 70 percent of the gasoline level.

The diesel HC and CO emissions are much lower than the gasoline emissions. Even when expressed in grams/lb of fuel, the better fuel economy of the diesel is not sufficient to cause the grams/lb of fuel HC and CO emissions to be higher than the gasoline emissions. When expressed as grams/lb of fuel, the average diesel HC emission level is approximately 12 percent of the gasoline HC level. The fleet average diesel CO level is 11 percent of the controlled gasoline fleet average level when expressed in terms of grams/lb of fuel and 6 percent of controlled gasoline fleet average level when expressed in terms of grams/ton-mile.

The comparison of g/ton-mile emissions of gasoline and diesel are quite interesting, in that they agree with light duty diesel and gasoline studies of the Mercedes 220 passenger car. These matched experiments of a car powered by a four-cylinder gasoline and a similar Mercedes powered by a four-cylinder diesel engine, by the Federal light duty transient test procedure, showed the diesel to have about one-tenth the hydrocarbons, one twenty-fifth the CO and about half the NO_x as its gasoline counterpart. In this case, the measurements were based on grams per mile, the best expression of an automobile's contribution to air pollutants. The social value, in this case, is the ability to transport an average of 1.5 to 1.8 people, an insignificant payload-weight relative to the vehicle weight.

One final remark should be made about the use of the road results. Only under circumstances of national or regional air pollution impact estimation should g/mile emission rates be used. Direct comparison of large vehicles to small vehicles in heavy duty use, whether gasoline or diesel, is not advised because this method of expression does not include the social value of the truck. This fact was recognized some years ago in developing test procedures for gasoline and diesel engines in heavy duty use based on power output of the engine, i.e., the brake specific emission rate. Grams per pound of fuel is considered a good means of emissions expression for a given truck or engine or even a group of similarly powered trucks, such as all gasoline or all diesel. However, dividing emission rate in grams/hour by the amount of fuel consumed penalizes the more efficient engine which burns the least fuel. In the case of diesel compared to gasoline, there is a substantial difference in efficiency; and therefore, such comparisons must be considered carefully, with a view to the difference in the amount of fuel necessary to do a given job.

2. Chassis Dynamometer Test Emissions

Each of the trucks tested over the San Antonio Road Route was also tested in the laboratory using a chassis version of the appropriate heavy duty FTP. The gasoline powered trucks were subjected to a chassis version of the 1970 to 1973 gasoline heavy duty nine-mode FTP. The diesel powered trucks were tested using a chassis version of the 1974 diesel 13-mode FTP. The 1974 and later Federal Test Procedure for both gasoline and diesel engines expresses the emission results in grams per horsepower hour. For diesel trucks, it was possible to use the fuel flow rate relationship to engine power to obtain engine power and thus express the chassis 13-mode results in g/bhp-hr. However, for gasoline trucks, no such reasonably reliable method exists for determining engine power output on a chassis dynamometer. Therefore, the 1970 to 1973 nine-mode FTP method for expressing emission results in volumetric concentrations was used. Mass emissions for the nine-mode procedure were obtained, however, by sampling during the entire nine-mode test using a truck size CVS.

Table 26 presents the results of the chassis dynamometer testing of the three groups of trucks. The nine-mode results in concentrations and the 13-mode results in g/bhp-hr are presented for comparison with

TABLE 26. CHASSIS DYNAMOMETER TEST RESULTS FROM THE SAN ANTONIO ROAD ROUTE GASOLINE POWERED AND DIESEL POWERED TRUCKS

Truck No.	Engine Mfr.	CID	HC, ppm	CO, %	NO, ppm	g/lb of fuel			9-Mode fuel, lbs	13-Mode FTP, g/bhp-hr				13-Mode Composite BSFC
						HC	CO	NO_x		HC	CO	NO_2	$HC+NO_2$	
Controlled Gasoline Powered Trucks														
			Nine-Mode FTP			Nine-Mode CVS								
1	IHC	345	274	2.07	2302	9.61	104	15.88	6.26	-	-	-	-	-
2	Chev	350	139	1.95	801	5.57	110	7.34	7.21	-	-	-	-	-
3	IHC	304	268	2.03	1388	11.30	120	12.94	5.37	-	-	-	-	-
4	Ford	300	163	0.29	2516	7.04	15	25.47	4.82	-	-	-	-	-
5	Chev	350	213	2.09	678	8.49	122	5.96	6.61	-	-	-	-	-
6	Ford	330	265	0.68	2273	12.38	52	18.82	5.44	-	-	-	-	-
7	GMC	351	472	6.02	518	16.16	286	3.19	5.63	-	-	-	-	-
8	Ford	391	293	1.27	1912	14.49	92	15.53	6.42	-	-	-	-	-
9	Ford	330	254	0.77	2340	10.76	56	18.81	5.49	-	-	-	-	-
10	Ford	361	228	0.64	2241	7.58	46	16.75	6.21	-	-	-	-	-
11	Dodge	318	323	1.51	1891	12.05	99	14.77	5.75	-	-	-	-	-
12	IHC	345	200	1.31	1364	11.87	94	9.61	5.56	-	-	-	-	-
13	IHC	304	248	0.89	2353	11.72	64	17.96	4.99	-	-	-	-	-
14	IHC	345	173	1.18	1347	9.96	92	9.62	5.94	-	-	-	-	-
15	Ford	300	68	0.51	2015	4.34	42	16.28	5.14	-	-	-	-	-
16	Ford	300	139	0.26	2793	7.11	24	22.75	4.22	-	-	-	-	-
17	White	400	381	5.38	927	15.62	317	4.99	7.60	-	-	-	-	-
18	IHC	478	376	2.22	1657	13.55	116	8.97	9.63	-	-	-	-	-
19	IHC	478	263	0.94	2175	11.15	69	14.20	7.66	-	-	-	-	-
20	White	400	239	2.73	1620	11.08	164	10.16	6.91	-	-	-	-	-
21	GMC	427	475	6.72	613	20.18	372	2.64	9.99	-	-	-	-	-
22	Chev	350	311	3.05	1094	13.67	169	8.81	6.78	-	-	-	-	-
23	Dodge	318	298	7.32	436	9.70	362	1.72	6.14	-	-	-	-	-
24	Chev	366	192	1.25	879	8.13	85	5.61	7.20	-	-	-	-	-
25	Dodge	318	370	1.80	2414	14.36	121	15.91	6.36	-	-	-	-	-
Average			265	2.19	1622	11.11	128	12.19	6.37	-	-	-	-	-
Precontrolled Gasoline Powered Trucks														
G-1	Ford	330	398	4.56	1135	19.60	254	7.02	6.58	-	-	-	-	-
G-2	IHC	304	458	2.79	1471	24.58	162	9.61	5.83	-	-	-	-	-
G-3	Ford	300	328	3.80	1511	13.42	215	9.58	5.89	-	-	-	-	-
G-4	Chev	350	473	4.42	924	26.98	189	6.58	7.40	-	-	-	-	-
G-5	Dodge	318	565	4.15	1279	18.68	248	6.62	5.48	-	-	-	-	-
G-6	IHC	345	160	0.93	848	5.33	60	6.67	5.63	-	-	-	-	-
G-7	Chev	292	288	4.37	1157	11.23	247	6.55	5.50	-	-	-	-	-
G-8	GMC	351	390	3.49	1154	14.26	192	6.61	7.39	-	-	-	-	-
G-9	Chev	366	384	1.93	1698	14.52	111	12.27	6.71	-	-	-	-	-
G-10	Ford	391	284	4.66	631	10.30	233	4.33	7.22	-	-	-	-	-
Average			373	3.51	1181	15.89	191	7.58	6.36	-	-	-	-	-
Diesel Powered Trucks														
						13-Mode g/lb of fuel								
								NO_2						
D-1	Caterpillar	573	-	-	-	6.73	14.03	14.34	-	3.11	6.49	6.63	9.74	0.463
D-2	Cummins	903	-	-	-	0.44	5.78	10.57	-	0.19	2.54	4.65	4.84	0.440
D-3	Det.Diesel	426	-	-	-	0.72	27.55	24.62	-	0.32	12.28	10.97	11.29	0.446
D-4	Cummins	855	-	-	-	0.57	12.55	15.92	-	0.24	5.30	6.72	6.96	0.422
D-5	Caterpillar	636	-	-	-	3.95	13.30	13.81	-	1.84	6.20	6.43	8.28	0.465
D-6	Mack	672	-	-	-	1.33	3.90	23.38	-	0.54	1.59	9.53	10.07	0.408
D-7	Det. Diesel	568	-	-	-	1.66	16.52	23.66	-	0.75	7.47	10.69	11.45	0.453
D-8	Mack	672	-	-	-	5.82	7.15	46.59	-	2.39	2.94	19.16	21.55	0.412
D-9	Cummins	855	-	-	-	0.84	5.09	28.51	-	0.38	2.31	12.92	13.30	0.453
D-10	Det. Diesel	212	-	-	-	5.81	17.05	21.12	-	3.10	9.10	11.28	14.38	0.535
Average			-	-	-	2.79	12.29	22.25	-	1.29	5.62	9.90	11.19	0.450

like data from other studies. The only method of comparison between the diesel and the gasoline tests is grams/lb of fuel. However, any comparison made between the gasoline and diesel tests must recognize that the test procedures are two distinctly different tests.

The range of emissions from each group of trucks varied considerably. The maximum emissions for the precontrolled gasoline powered trucks were 3 to 5 times the minimum emission level regardless of type of emission or method of expression.

For the controlled gasoline powered trucks, the maximum HC level was 7 times the minimum level in ppm and 5 times the minimum in g/lb of fuel from CVS results. The maximum CO level for the controlled trucks was 28 times the minimum in percent found from the FTP procedure and 25 times the minimum in g/lb of fuel from CVS testing. The maximum corrected NO from the controlled trucks is 6 times the minimum ppm from the FTP procedure and 15 times the minimum in g/lb of fuel from the CVS results. The chassis tests show the same differences in the magnitude of the CO emission range between the precontrolled and controlled truck as did the road tests.

The maximum HC emission level for the diesel trucks was 16 times the minimum for both methods of expression of the 13-mode results. The maximum CO emission from the diesel group was 8 times the minimum level for both methods of expressing the 13-mode results. The maximum NO_2 from the diesel trucks was 4 times the minimum for both methods of expression. It should again be emphasized that the diesel results in g/lb of fuel are just an alternate way of expressing the emissions from the 13-mode test and use the same raw emissions data as the results expressed in g/bhp-hr. The gasoline nine-mode results in g/lb of fuel, however, are obtained from a different sampling and analytical system than the results in volumetric concentration. However, the two sampling and analytical systems are operated simultaneously and thus give two sets of results for the same test.

There is a great temptation to compare the gasoline and diesel chassis dynamometer test emission results. However, the reason for listing the results in g/lb of fuel in Table 25 is for comparison with the chassis FTP results and the road results from the same trucks. While valuable comparisons could be made between the diesel and gasoline chassis emissions for special purposes, taken out of context, these comparisons could lead to erroneous conclusions. For instance, from the information in Table 26, it could be calculated that diesel engines produce twice as much NO_x in terms of g/lb of fuel as controlled gasoline trucks and 3 times the NO_x of precontrolled gasoline trucks. The road tests indicate, however, that such a conclusion is not warranted. Therefore, no comparisons between diesel and gasoline chassis tests will be made in this report, but the chassis test results will be compared to the road results for each group of trucks.

3. Comparison of Road and Chassis Emissions

Table 27 repeats the listing of chassis and road emission results and lists the ratio of chassis/road test emissions for each truck. A column showing HC+NO_x has been added for the chassis and road emissions and the ratio of the two, since current (1974 and 1975) Federal standards combine the two emissions.

The precontrolled gasoline powered truck group had HC ratios that varied from 0.19 to 1.13, CO ratios that varied from 0.39 to 1.38 and NO_x ratios that varied from 1.06 to 2.36. The HC+NO_x ratios varied from 0.26 to 1.22. The controlled gasoline powered trucks had HC ratios that varied from 0.51 to 1.27, CO ratios that varied from 0.17 to 1.32, NO_x ratios from 0.69 to 1.61, and HC+NO_x ratios from 0.67 to 1.51. The diesel powered trucks had HC ratios that varied from 0.17 to 1.63, CO ratios from 0.36 to 1.67, NO_x ratios from 0.84 to 2.22 and HC+NO_x ratios from 0.73 to 1.92.

While there is a moderate spread in the values of these ratios, they do seem to indicate some correlation between the chassis tests and the road tests, with the ratio perhaps being a function of the emission level. While it is beyond the scope and purpose of this report, further statistical analysis of this data would certainly be worthwhile.

To facilitate the comparison of the emission results from each truck group, the average emission values of each type of test for each truck group is presented in Table 28. Also shown in the table are the average emission values calculated from all 35 gasoline powered trucks, so that a comparison of all gasoline trucks tested can be made with the diesel trucks. The table does an excellent job of summarizing this section of the report. Comparing the precontrolled and controlled gasoline powered trucks, it appears that the controlled trucks have lower HC and CO emissions both on tne road and in the laboratory. The controlled trucks appear to have higher NO levels on the chassis dynamometer and higher NO_x levels on the road than the precontrolled trucks. The chassis dynamometer test results of the gasoline powered and diesel powered trucks are not compared for reasons previously explained. When the results from road tests of the diesel and gasoline powered trucks are compared, the HC and CO emissions from the diesel trucks were found to be considerably lower than the gasoline trucks regardless of how the results are expressed. When comparing the NO_x emissions from the diesel and gasoline powered trucks, the method of expressing the emissions does make a difference in the conclusions drawn from the table. Looking at the NO_x emissions in g/lb of fuel and g/mile, it would appear that the diesel NO_x emissions are one and one-half to two times the gasoline emissions. However, when the difference in truck size is taken into account, as it is when expressing emissions in

TABLE 27. COMPARISON OF ROAD TEST AND CHASSIS DYNAMOMETER TEST RESULTS FOR GASOLINE POWERED AND DIESEL POWERED TRUCKS

(grams per pound of fuel)

Truck No.	Chassis Dynamometer Emissions, g/lb of fuel				Road Emissions, g/lb of fuel				Ratio, Chassis Test/Road Test Emissions			
	HC	CO	NO_x	$HC+NO_x$	HC	CO	NO_x	$HC+NO_x$	HC	CO	NO_x	$HC+NO_x$
Controlled Gasoline Powered Trucks												
1	9.61	104	15.88	25.49	10.07	145	14.99	25.06	0.95	0.72	1.06	1.02
2	5.57	110	7.34	12.91	6.93	118	8.57	15.50	0.80	0.93	0.86	0.83
3	11.30	120	12.94	24.24	13.02	180	8.73	21.75	0.87	0.67	1.48	1.11
4	7.04	15	25.47	32.51	5.82	87	19.11	24.93	1.21	0.17	1.33	1.30
5	8.49	122	5.96	14.45	8.06	166	8.64	16.70	1.05	0.73	0.69	0.87
6	12.38	52	18.82	31.20	14.91	122	14.05	28.96	0.83	0.43	1.34	1.08
7	16.16	286	3.19	19.35	17.90	285	3.79	21.69	0.90	1.00	0.84	0.89
8	14.49	92	15.53	30.02	19.61	162	11.40	31.01	0.74	0.57	1.36	0.97
9	10.76	56	18.81	29.57	15.91	119	12.41	28.32	0.68	0.47	1.52	1.04
10	7.58	46	16.75	24.33	12.88	140	12.18	25.29	0.59	0.31	1.38	0.96
11	12.05	99	14.77	26.82	15.91	141	11.07	27.21	0.76	0.70	1.33	0.99
12	11.87	94	9.61	21.48	15.17	192	6.29	21.46	0.78	0.49	1.53	1.00
13	11.72	64	17.96	29.68	12.90	155	11.25	24.15	0.91	0.42	1.60	1.23
14	9.96	92	9.62	19.58	11.14	139	6.27	17.41	0.89	0.66	1.53	1.12
15	4.34	42	16.28	20.62	3.73	102	12.80	16.53	1.16	0.41	1.27	1.25
16	7.11	24	22.95	30.06	5.61	39	14.27	19.88	1.27	0.63	1.61	1.51
17	15.62	317	4.99	20.61	23.86	271	5.76	29.62	0.65	1.17	0.87	0.70
18	13.55	116	8.97	22.52	26.32	244	7.10	33.42	0.51	0.48	1.26	0.67
19	11.55	69	14.20	25.75	15.96	118	13.44	29.40	0.72	0.58	1.06	0.88
20	11.08	164	10.16	21.24	17.23	124	11.50	28.73	0.64	1.32	0.88	0.74
21	20.18	372	2.64	22.82	17.91	310	3.25	21.16	1.13	1.20	0.81	1.08
22	13.67	169	8.81	22.48	18.77	209	6.32	25.09	0.73	0.81	1.39	0.90
23	9.70	362	1.72	11.42	13.54	377	1.66	15.20	0.72	0.96	1.04	0.75
24	8.13	86	5.61	13.74	11.54	107	8.16	19.70	0.70	0.80	0.69	0.70
25	14.36	121	15.91	30.27	24.18	172	11.01	35.19	0.59	0.70	1.45	0.86
Avg.	11.11	128	12.19	23.33	14.36	169	9.77	24.13	0.83	0.69	1.20	0.96
Precontrolled Gasoline Powered Trucks												
G-1	19.60	254	7.02	26.62	24.46	250	6.05	30.51	0.80	1.02	1.16	0.87
G-2	24.58	162	9.61	34.19	22.28	235	5.85	28.13	1.10	0.69	1.64	1.22
G-3	13.42	214	9.58	22.70	11.91	243	8.89	20.80	1.13	0.88	1.08	1.09
G-4	26.98	189	6.58	33.56	29.58	206	5.58	35.16	0.91	0.92	1.18	0.95
G-5	18.68	248	6.62	25.30	24.08	256	3.04	27.12	0.73	0.91	2.05	0.93
G-6	5.33	60	6.67	12.00	12.29	154	5.15	17.44	0.43	0.39	1.30	0.69
G-7	11.23	247	6.55	17.78	16.74	271	2.77	19.51	0.67	0.91	2.36	0.91
G-8	14.26	192	6.61	20.87	76.15	189	5.17	81.32	0.19	1.01	1.28	0.26
G-9	14.52	111	12.27	26.79	66.98	145	9.66	76.64	0.22	0.77	1.27	0.35
G-10	10.30	233	4.33	14.63	13.42	169	6.80	20.22	0.77	1.38	1.06	0.72
Avg.	15.89	191	7.58	23.44	29.79	212	5.90	35.69	0.70	0.89	1.44	0.80
Diesel Powered Trucks												
D-1	6.73	14.03	14.34	21.07	6.97	8.42	10.98	17.95	0.97	1.67	1.31	1.17
D-2	0.44	5.78	10.57	11.01	2.58	8.93	12.56	15.14	0.17	0.64	0.84	0.73
D-3	0.72	27.55	24.62	25.34	1.13	60.30	12.58	13.71	0.64	0.46	1.96	1.85
D-4	0.57	12.55	15.92	16.49	1.71	9.46	10.07	11.78	0.33	1.32	1.58	1.40
D-5	3.95	13.30	13.81	17.76	3.26	9.13	10.95	14.21	1.21	1.46	1.26	1.25
D-6	1.33	3.90	23.38	24.71	0.98	9.04	13.75	14.73	1.36	0.43	1.70	1.68
D-7	1.66	16.52	23.66	25.32	1.57	15.25	16.06	17.63	1.06	1.08	1.47	1.44
D-8	5.82	7.15	46.59	52.41	6.71	7.71	20.97	27.68	0.87	0.93	2.22	1.89
D-9	0.84	5.09	28.51	29.35	1.58	10.48	13.70	15.28	0.53	0.49	2.08	1.92
D-10	5.81	17.05	21.12	26.93	3.55	47.57	14.08	17.63	1.63	0.36	1.50	1.53
Avg.	2.79	12.29	22.25	25.04	3.01	18.63	13.57	16.57	0.88	0.88	1.61	1.49

Note: Regarding emissions in grams per pound of fuel, caution should be used in comparing gasoline and diesel-powered vehicles, due to differences in their engine efficiencies.

TABLE 28. EMISSION COMPARISON OF PRECONTROLLED GASOLINE POWERED, CONTROLLED GASOLINE POWERED, AND DIESEL POWERED TRUCKS TESTED ON THE SARR

Test Type and Emission Type	Average of 10 Precontrolled Gasoline Trucks	Average of 25 Controlled Gasoline Trucks	Average of All 35 Gasoline Trucks	Average of 10 Diesel Trucks
Nine-Mode Chassis				
HC, ppm	373	265	296	-
CO, percent	3.51	2.18	2.56	-
NO, ppm	1181	1671	1531	-
HC, g/lb of fuel	15.89	11.11	12.48	-
CO, g/lb of fuel	191	128	146	-
NO_x, g/lb of fuel	7.58	12.19	10.87	-
13-Mode Chassis				
HC, g/bhp-hr	-	-	-	1.29
CO, g/bhp-hr	-	-	-	5.62
NO_2, g/bhp-hr	-	-	-	9.90
HC, g/lb of fuel	-	-	-	2.79
CO, g/lb of fuel	-	-	-	12.29
NO_2, g/lb of fuel	-	-	-	22.25
Road Tests	-			
HC, g/lb of fuel	29.79	14.36	18.77	3.01
CO, g/lb of fuel	212	169	181	18.63
NO_x, g/lb of fuel	5.90	9.77	8.66	13.57
HC, g/mile	35.38	17.08	22.31	3.72
CO, g/mile	238	201	212	23.52
NO_x, g/mile	6.81	10.48	9.43	18.74
*HC, g/ton-mile	4.31	1.99	2.65	0.24
*CO, g/ton-mile	31.60	24.50	26.5[illegible]	1.50
*NO_x, g/ton-mile	0.86	1.41	1.25	1.01
Ratio, Chassis/Road**				
HC	0.70	0.83	0.79	0.88
CO	0.89	0.69	0.75	0.88
NO_x	1.44	1.20	1.27	1.61

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*Based on vehicle test weight.

**Based on g/lb of fuel

g/ton-mile, the NO_x emissions of the diesel and gasoline powered trucks are approximately equal.

The emissions obtained from the testing of these three groups of trucks should prove useful in both national and regional inventory and impact studies and many of the tables in this section can be used directly for that purpose. For more detailed results, the reader is referred to the contract final reports for each of the truck groups.

C. SUMMARY AND COMPARISON OF OPERATIONAL PERFORMANCE

In addition to measuring emissions over the road course, certain indications of vehicle performance were also recorded. For gasoline powered trucks, the items recorded were vehicle speed in miles per hour (mph), engine speed in revolutions per minute (rpm), engine manifold vacuum and throttle position. The parameters recorded for the diesel powered trucks tests were vehicle speed in mph, engine speed in rpm, and fuel rate in pounds per hour. In addition, the fuel consumption in pounds of fuel per test was determined by weighing the test fuel tank before and after each test for both the diesel and gasoline powered trucks.

1. Summary of Average Values of Performance Indicators

Table 29 presents the average for each truck of the mean level of the performance parameters recorded during the road tests. The fleet average for each truck group is also shown for each of these parameters. In addition, average fuel economy from the weighed fuel consumption is shown in terms of miles per gallon and ton-miles per gallon (based on both test load and test weight).

2. Vehicle Speed

The average route speeds of the three groups of trucks as shown in Table 29 are 19.8 mph, 20.4 mph, and 19.4 mph for controlled gasoline, uncontrolled gasoline, and diesel trucks, respectively. The average speed for all 35 gasoline trucks is 20.0 mph. The maximum average route speed for any of the trucks was 25.9 mph. This was the average route speed for truck 16, a gasoline powered truck. The minimum speed of 16.85 mph was also obtained from tests of a gasoline truck (number G-9). While the highest average speed was recorded by one of the lightest trucks, the lowest average speed was from a truck of moderate test weight. Apparently, truck size and weight were not particularly responsible for the average route speed of these two trucks. Although the range of average route speed was approximately 9 mph, 35 of the 45 trucks (78 percent) had average route speeds between 18 and 22 mph.

Average route speed is one way to characterize the road test route. Another way to characterize the test route is to determine the percent of time that the vehicle is within various speed intervals. These percent times at various intervals will be referred to in this report as the speed profile of the trucks. For the San Antonio Road Route tests summarized here, the percent time in speed intervals of two mph from 0 to 60 mph were calculated for each test run. These times were averaged for each truck and these values were then averaged to obtain a group average.

TABLE 29. OPERATIONAL PERFORMANCE SUMMARY FOR GASOLINE POWERED AND DIESEL POWERED TRUCKS TESTED ON THE SAN ANTONIO ROAD ROUTE

				Performance Parameter Averages				Fuel Economy		
Truck No.	Test Weight	Engine CID	Engine Mfr.	Vehicle Speed, MPH	Engine RPM	Manifold Vacuum, in. Hg.	Fuel Rate lbs/hr	Based on Test Load* ton-mile/gal	Based on Test Weight** ton-mile/gal	Miles/gal
				Controlled Gasoline Powered Trucks						
1	11,945	345	IHC	18.9	1648	16.2	-	14.09	41.51	6.95
2	13,605	350	Chev	17.2	1622	15.4	-	13.32	41.22	6.06
3	14,530	304	IHC	17.2	1555	14.2	-	14.73	47.88	6.59
4	9,740	300	Ford	20.6	1651	11.6	-	9.55	31.89	7.43
5	13,580	350	Chev	22.5	1879	12.6	-	13.86	42.57	6.27
6	17,645	330	Ford	19.2	1759	12.5	-	17.79	49.41	5.60
7	14,010	351	GMC	21.3	1472	13.9	-	17.02	43.43	6.20
8	19,150	391	Ford	20.5	1581	13.0	-	22.38	51.32	5.36
9	17,600	330	Ford	19.7	1511	11.4	-	19.01	52.27	5.94
10	14,870	361	Ford	21.3	1550	13.8	-	13.23	45.43	6.11
11	17,325	318	Dodge	22.3	1781	13.6	-	19.92	51.72	5.97
12	16,430	345	IHC	20.8	1667	11.7	-	17.06	46.17	5.62
13	13,275	304	IHC	19.1	1466	12.9	-	13.43	47.86	7.21
14	17,625	345	IHC	18.9	1747	12.8	-	19.46	49.88	5.66
15	9,590	300	Ford	25.9	1683	11.2	-	9.23	30.55	7.18
16	9,050	300	Ford	17.7	1612	12.0	-	8.62	27.65	6.71
17	21,380	400	White	18.3	1500	13.3	-	17.67	43.00	4.10
18	21,080	478	IHC	18.8	1558	13.8	-	17.88	46.28	4.01
19	23,075	478	IHC	19.7	1738	13.9	-	20.26	52.38	4.54
20	20,875	400	White	18.3	1726	13.0	-	19.54	50.20	4.81
21	22,290	427	GMC	17.5	1782	12.4	-	19.14	41.79	3.75
22	17,165	350	Chev	22.3	1994	14.2	-	16.27	40.85	4.76
23	12,735	318	Dodge	18.7	1918	12.9	-	8.13	31.71	4.98
24	20,880	366	Chev	18.0	1728	13.9	-	26.97	50.63	4.85
25	17,065	318	Dodge	19.8	1706	13.4	-	16.29	46.08	5.40
			Average	19.6	1673	13.2	-	16.19	44.15	5.68
				Precontrolled Gasoline Powered Trucks						
G-1	12,400	330	Ford	21.98	1502	14.3	-	14.65	39.49	6.37
G-2	14,900	304	IHC	20.07	1636	12.2	-	10.97	49.10	6.59
G-3	9,140	300	Ford	21.19	1474	14.6	-	9.45	33.64	7.36
G-4	13,475	350	Chev	21.36	1867	14.6	-	16.74	39.95	5.93
G-5	13,875	318	Dodge	21.14	1576	12.1	-	16.48	40.65	5.86
G-6	18,960	345	IHC	19.50	1663	11.6	-	18.96	42.09	4.44
G-7	14,850	292	Chev	24.11	1672	12.3	-	12.78	39.72	5.35
G-8	15,970	351	GMC	19.16	1358	12.9	-	8.39	37.85	4.74
G-9	22,650	366	Chev	16.85	1451	12.5	-	22.06	55.95	4.94
G-10	28,900	391	Ford	18.97	1312	12.8	-	29.49	58.38	4.04
			Average	20.43	1551	13.0	-	15.99	43.68	5.56
				Diesel Powered Trucks						
D-1	18,820	573	Caterpillar	19.13	1589	-	17.57	23.70	76.13	8.09
D-2	42,800	903	Cummins	18.89	1476	-	32.71	36.27	101.05	4.75
D-3	41,500	426	Det. Diesel	19.28	1252	-	23.82	44.66	113.09	5.45
D-4	39,490	855	Cummins	19.59	1470	-	28.21	36.44	95.17	4.82
D-5	37,610	636	Caterpillar	19.56	1250	-	23.25	43.85	109.07	5.80
D-6	49,460	672	Mack	19.31	1253	-	26.73	53.01	117.22	4.74
D-7	50,580	568	Det. Diesel	19.50	1295	-	34.96	44.99	102.17	4.04
D-8	41,090	672	Mack	19.81	1305	-	25.76	45.64	108.27	5.27
D-9	50,980	855	Cummins	20.11	1447	-	36.63	42.09	96.35	3.78
D-10	14,430	212	Det. Diesel	19.02	1198	-	16.57	11.73	59.16	8.20
			Average	19.42	1354	-	20.62	38.24	97.82	5.49

*Test Load = (GVW - Empty Weight)/2

**Test Weight = Empty Weight + Test Load

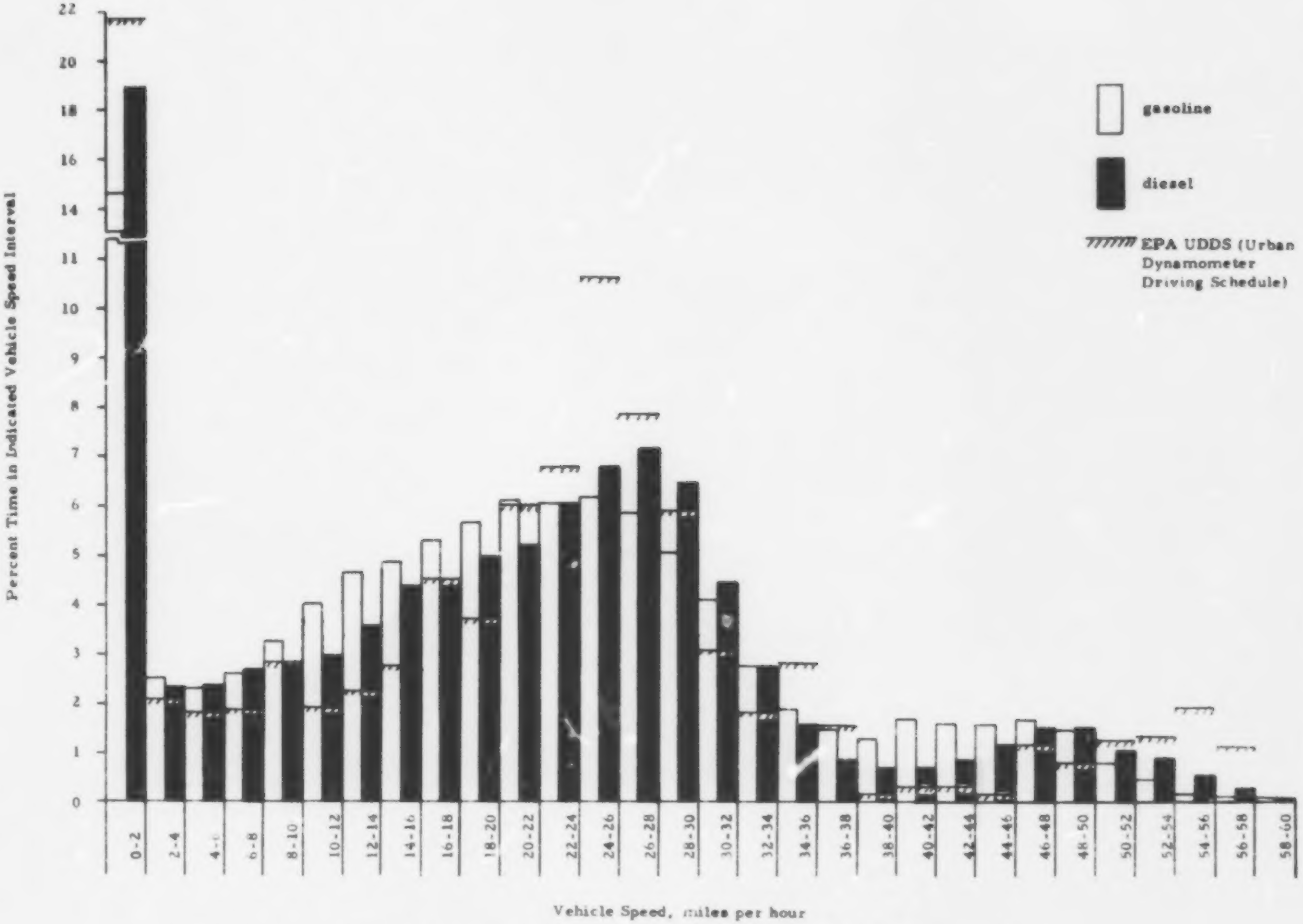

FIGURE 28. AVERAGE PERCENTAGE TIME IN VARIOUS SPEED INTERVALS FOR DIESEL AND GASOLINE POWERED TRUCKS ON THE SARR

Figure 28 compares the speed profile of the diesel and gasoline powered trucks. For this comparison, the 35 gasoline powered vehicles, both precontrolled and controlled, were considered as one group. While the two profiles are similar, there are some interesting differences. The diesel trucks spent more time in the 0 to 2 mph speed interval than the gasoline powered trucks. The diesel trucks also spent more time in the 24 to 32 mph and 48 to 58 mph speed intervals. For any individual 2 mph interval, the diesel trucks spent the most time (other than 0-2 mph) in the 26 to 28 mph interval, while the gasoline powered trucks spent the most time (other than 0-2 mph) in the 24-26 mph interval. The reasons for these small differences is not obvious and indeed further analysis is required to determine if the differences are even significant. For the purpose of the San Antonio Road Route studies to date, these speed profiles serve to help define the route and indicate that there were only slight differences between the way gasoline and diesel trucks operated on the route.

The vehicle speed profile of the EPA urban dynamometer driving schedule (UDDS) used in the 1975 light duty Federal Test Procedure was also calculated for comparison purposes. Figure 28 shows the percent time spent in the various two mph intervals for the UDDS. The speed profile of the diesel and gasoline trucks operated over the San Antonio Road Route are strikingly similar to UDDS. The UDDS was developed from a carefully laid out driving course in urban Los Angeles known as the LA-4 road route.(7) It is intended to represent a typical home-to-work commuter drive.

The SARR, on the other hand, was laid out merely to provide a road course that involved several different types of driving such as arterial residential, urban congested (downtown), commercial, and freeway, and to require 20 to 30 minutes driving time. No claim is made that the course is typical of truck operation in the U.S. or that it is based on driving habits and patterns that have been carefully defined. Yet, in terms of percent of time at various speeds, the SARR is quite similar to the carefully researched UDDS.

The most time spent in any two mph interval for both the UDDS and SARR is in the 0-2 mph interval. This percentage of time, strictly speaking, is not all at idle conditions; for instance, in the UDDS 18.2 percent of the time is at idle,(7) but as can be seen from Figure 28, 21.7 percent of the time is spent in the 0 to 2 mph interval. The SARR data, however, does not separate out the time at idle and so the time in the 0 to 2 mph interval is often taken as the time at idle in this and other reports on the SARR studies.

The UDDS has a higher percentage of time spent in the 22 to 28 mph range and a smaller percentage of time in the 2 to 22 mph range than the trucks operated on the SARR. This may be a function of physical layout and traffic patterns of the two different routes. However, another reasonable explanation is simply that trucks accelerate and decelerate at a slower pace than the UDDS accelerations and decelerations, hence trucks spent a greater percentage of time in the slower speed ranges. The higher percentage of time spent at speeds above 50 mph in the UDDS compared to the SARR is almost certainly a function of physical layout and traffic density. The expressway portion of the SARR had a 55 mph speed limit for all of the road tests and traffic conditions often made the maximum attainable speed somewhat lower. Despite these small differences, the speed profiles from the UDDS and the SARR seem to indicate that they are similar driving patterns. It is hoped that this comparison will be an aid in understanding both the truck performance and exhaust emissions obtained on the SARR.

3. Engine Speed

Another important operational indicator is engine rpm. Table 29 lists the average engine rpm from the road tests for each truck. Since engine and transmission design characteristics determine the engine speed for a given vehicle speed, it is difficult to compare trucks with different engines and transmissions. Additionally, gasoline engines have broader engine operating speed ranges that result in typical operation at higher speeds than diesel engines. This makes direct comparisons of average engine speed between diesel and gasoline engines of limited value. The two smaller diesel powered delivery trucks were similar to a number of gasoline powered trucks and the engine and transmissions were all designed to do essentially similar jobs. Therefore, some trucks may be compared directly.

The fleet average engine rpm from all precontrolled gasoline powered trucks was 1551 rpm and from all the controlled gasoline trucks was 1673 rpm. The route average engine rpm for all 35 gasoline trucks was 1638 rpm. It is probable that the differences in average engine rpm between the precontrolled and controlled gasoline powered trucks were caused by differences in the fleet composition by engine manufacturer and engine and vehicle size, rather than as a result of pollution control systems. The route average engine rpm for diesel trucks was 1354 rpm. The lower average engine rpm for the diesel trucks, compared with the gasoline trucks, reflects the lower design speed range of diesel engines previously mentioned.

The average engine speeds for the gasoline powered trucks varied from a minimum of 1312 rpm obtained on truck G-10, a 1969 Ford tractor with a 391 CID engine, to a maximum of 1994 rpm obtained on truck 22, a 1971 Chevrolet tractor with a 350 CID engine. The diesel truck average engine speeds ranged from a low of 1198 rpm to a high of 1589 rpm. The lowest average diesel engine speed of 1198 rpm was from truck D-10, a 1970 Ford van with a Detroit Diesel 4I -53 engine. The highest average diesel engine speed of 1589 rpm was from a 1972 Ford van with a Caterpillar Model 1150 engine. It is interesting to note that these two trucks were the only vans in the diesel test fleet and are quite similar in size and other physical characteristics to a number of gasoline trucks.

Another way to look at engine operation over the road route is to calculate the percent time spent in various engine rpm intervals. The aggregate of these percent times will be called the engine rpm profile for the truck. For the San Antonio Road Route studies covered in this report, the percent time spent in engine rpm intervals of 200 rpm were calculated for each test. These times were averaged for each truck and these values then averaged to obtain the group average. Figure 29 compares the engine rpm profile of the diesel and gasoline powered trucks. As was done with the vehicle speed profile, the 35 gasoline powered trucks were considered one group for this comparison.

Figure 29 shows a close similarity between the diesel and gasoline powered engine rpm distributions. Of course, the gasoline engines show more time spent at engine speeds above 2400 rpm since the diesel engines governed speed was generally between 2200 and 2600 rpm while the governed speed for the gasoline engines was generally 3200 to 4000 rpm. While the diesel engines spent somewhat more time at idle than the gasoline engines, the maximum time spent in any rpm interval (other than idle) was approximately 13 percent in the 1600 to 1800 rpm interval for both diesel and gasoline powered trucks.

4. Power Level Indicator

Another important performance characteristic that is of interest is engine power level. Unfortunately, there is no easy way to measure engine power output on the road. Therefore, variables that could be correlated to relative engine power level were measured during road tests of both the gasoline and diesel powered trucks. The parameter used as an indicator of power level for the gasoline engines was engine intake manifold vacuum. The fleet average manifold vacuum for both the precontrolled and controlled gasoline trucks was essentially the same, being 13.0 inches of mercury for the precontrolled and 13.2 inches of mercury for the controlled trucks. The route average manifold vacuums for individual trucks varied from 11.2 to 16.2 inches of mercury (see Table 29).

The parameter used as an indication of power level for the diesel engines was fuel consumption rate. The governed fuel rate for the engines tested varied from approximately 100 lbs/hr to approximately 140 lbs/hr. The mean route average fuel rate for the diesel trucks was 26.62 lbs/hr. The average fuel rate for the individual trucks varied from 16.57 lbs/hr to 36.63 lbs/hr (see Table 29).

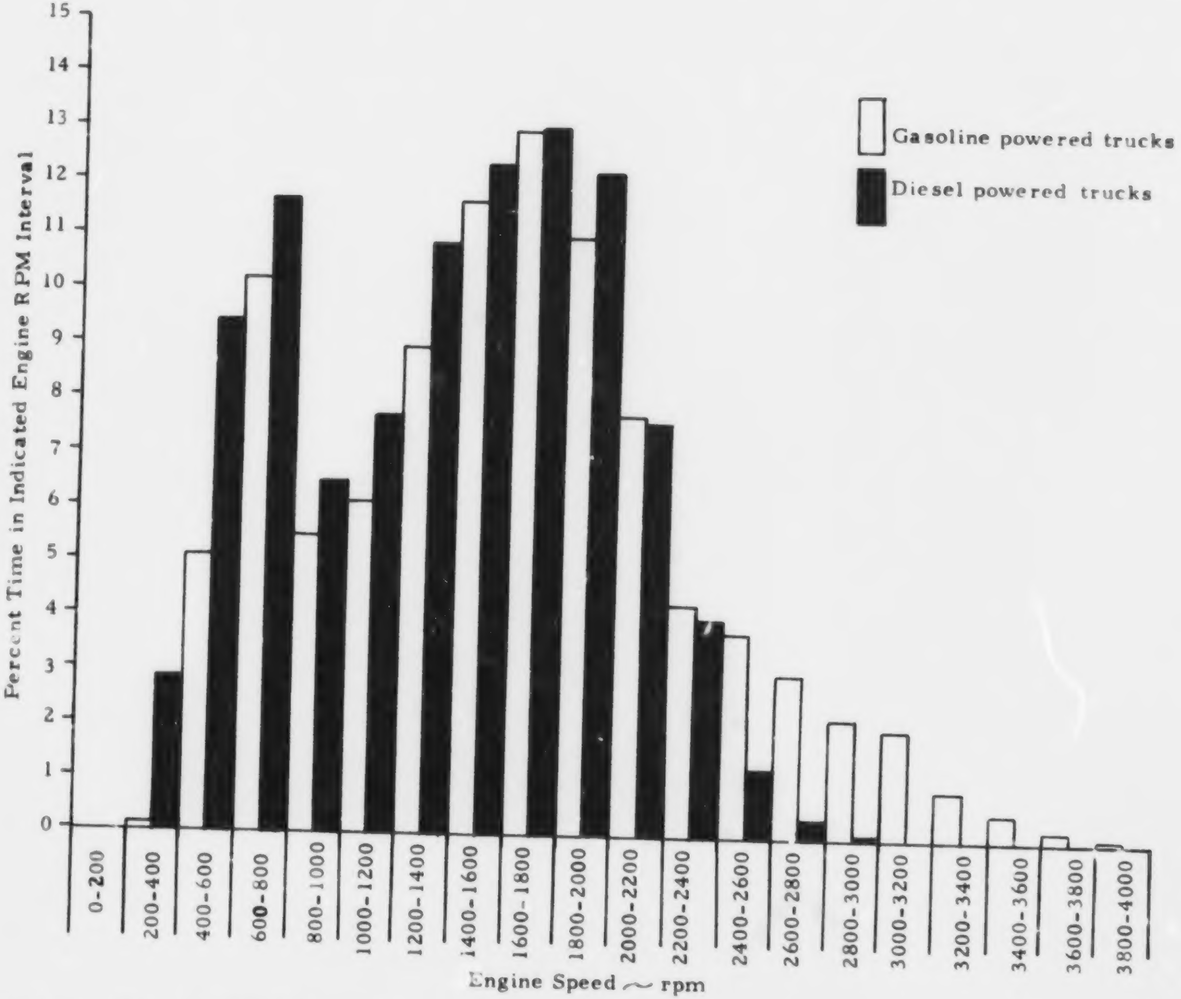

FIGURE 29. AVERAGE PERCENTAGE TIME IN VARIOUS ENGINE RPM INTERVALS FOR DIESEL AND GASOLINE POWERED TRUCKS ON THE SAKR

It is evident from both the manifold vacuum levels and the fuel rate levels that the engines were, on the average, operating at only moderate power levels. To obtain a better understanding of the power levels required by the road route, the percent time spent in various intervals of power level indicator (manifold vacuum or fuel rate) has been calculated. These calculations are similar to those explained previously for vehicle speed and engine rpm.

Figure 30 shows the average time spent in various one-inch of mercury intervals of intake manifold vacuum for the 35 gasoline trucks. Figure 31 shows the average time spent in various four lb/hr intervals of fuel rate for the 10 diesel trucks. Note that the manifold vacuum intervals have been arranged in decreasing levels from left to right. Since at a given engine speed, vacuum gauge level decreases with increasing power, the graph is roughly in order of increasing power. These histograms are of limited use in profiling engine performance. For this, a knowledge of the occurrence of both speed and vacuum (or fuel rate) as well as a maximum power curve of the engine is needed. Caution should be exercised in extrapolating the manifold vacuum and fuel rates to engine horsepower output. For example, the wide open throttle conditions represented by the under 3 inches of mercury manifold vacuum intervals at a low engine speed may or may not represent higher power output than say, the 10 inches of vacuum level at a higher engine speed. For the diesel trucks, the higher fuel rate levels are obtained only at higher speeds, and thus more clearly portray high speed, high power operation.

The only observation that will be drawn from these two plots is that apparently a large portion of the time the engines are operating at low power levels during the road tests. In addition, the graph for the diesel trucks indicates that the amount of time spent in any power level decreases with fuel input and (presumably) power output. The trend of the manifold vacuum from the gasoline trucks which decreases from 18 inches (idle and cruise) to 11 inches and then increases to 0 inches of mercury (WOT) needs additional analysis, beyond the scope of this study, for proper interpretation.

5. Fuel Consumption and Fuel Economy

An increasingly important vehicle performance characteristic is fuel consumption. As mentioned previously, fuel consumption was measured both on the road and during the chassis dynamometer tests. Table 29 listed the fuel economy for the road tests in terms of miles/gallon and also ton-miles/gallon. Expressing fuel economy in ton-miles/gallon is an attempt to include the social value (that is, the ability of the truck to carry goods and services) in the fuel economy expression, just as expressing emissions in grams/ton-mile is an attempt to include social value in the exhaust emission levels. The fuel economy in ton-miles/gallon is calculated by two methods. One method uses the vehicle test load as the weight in tons.

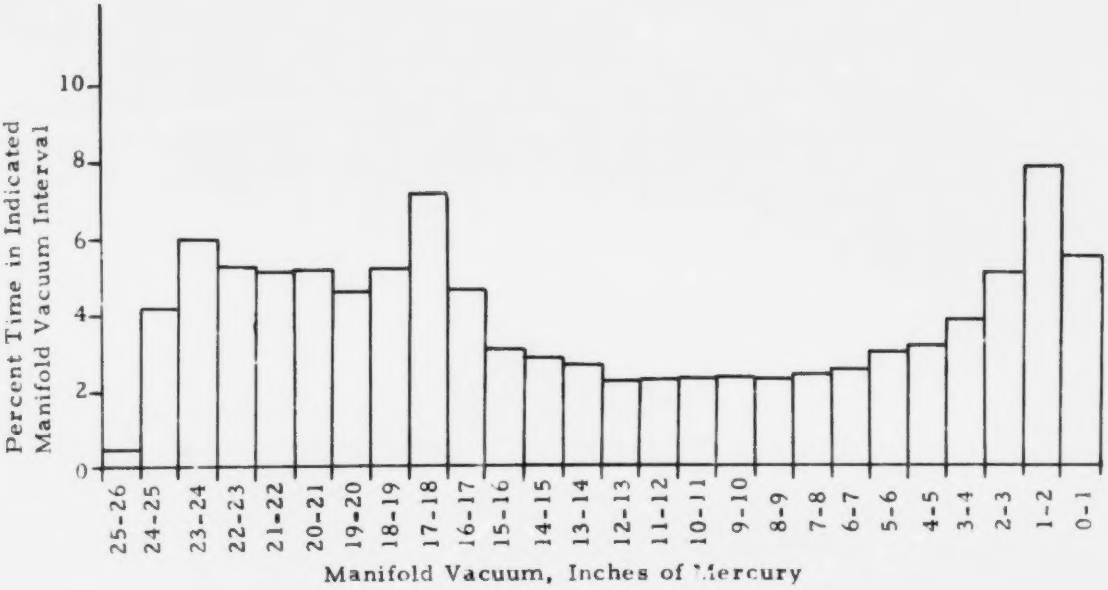

FIGURE 30. AVERAGE PERCENT TIME IN VARIOUS INTAKE MANIFOLD VACUUM INTERVALS FOR GASOLINE TRUCKS TESTED ON THE SARR

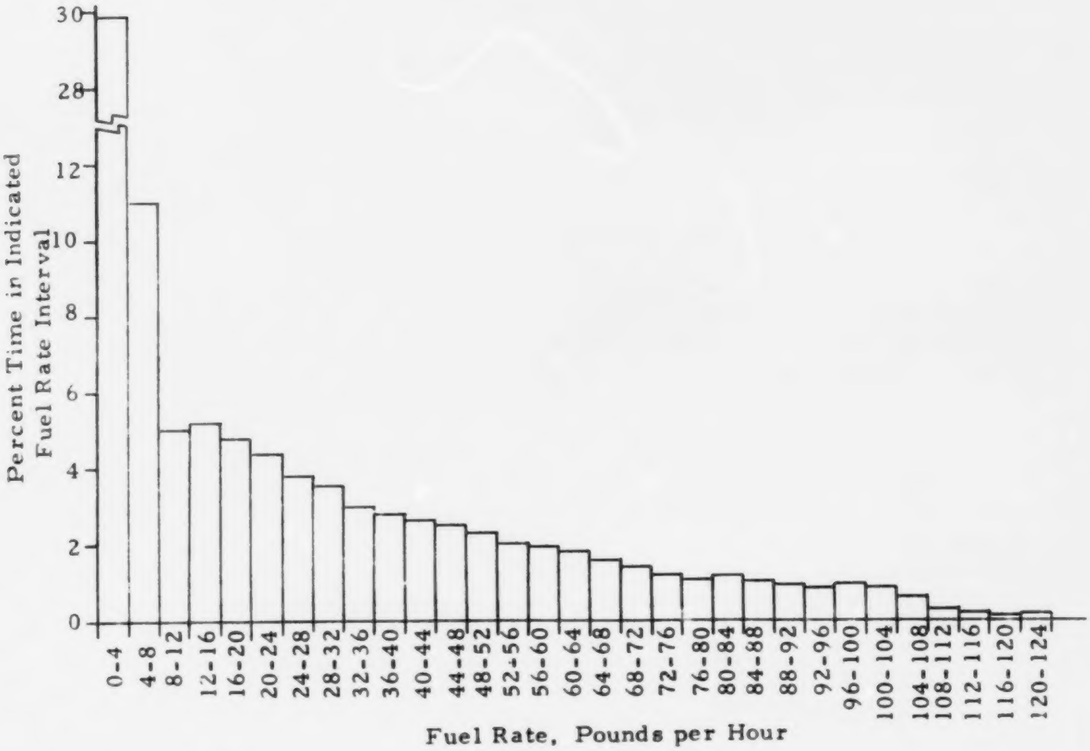

FIGURE 31. AVERAGE PERCENT TIME IN VARIOUS FUEL RATE INTERVALS FOR DIESEL TRUCKS TESTED ON THE SARR

Only the ton-miles/gallon calculated using test weight will be discussed here along with the traditional miles/gallon.

Looking first at fuel economy in miles/gallon (mpg), the table shows the lowest mpg from the precontrolled gasoline trucks to be 4.04 mpg and the highest 7.36 mpg. The fuel economy for the controlled gasoline trucks ranges from 3.75 mpg to 7.43 mpg. The diesel fuel economy varies from 3.78 to 8.20 mpg. Of course, fuel economy in miles/gallon is a function of vehicle weight, among other factors, and a better way to compare the fuel economies of the three truck groups is as a function of vehicle test weight. Figure 32 is a plot of fuel economy in mpg as a function of vehicle test weight. The graph shows clearly that there is a decrease in fuel economy as vehicle weight increases. This decrease seems to be more rapid for the gasoline powered vehicles than the diesel powered vehicles. The graph also indicates that there is no significant difference in fuel economy in mpg for the precontrolled and controlled gasoline powered trucks. There is a large difference, however, between the diesel and gasoline powered trucks, with the diesel trucks showing the better fuel economy characteristic of the diesel engine.

For example, a direct comparison may be made between diesel and gasoline two axle type delivery truck fuel economy from Figure 32. At a test weight of approximately 16,000-lb (24,000-lb GVW), the diesel recorded 8.1 mpg. This is a 47 percent increase in fuel economy relative to 5.5 mpg average for the gasoline trucks graphed in Figure 32. From a fuel usage standpoint, it is apparent that two gasoline trucks would consume the same number of gallons of fuel that three diesel-powered trucks of the same 24,000-lb GVW loaded to half payload and operated over the same route by the same drivers.

Although fuel is sold by the gallon, diesel and gasoline fuel prices can be the same or higher or lower relative to each other for a number of reasons. A better comparison of the 5.5 and 8.1 mpg might be to consider the BTU content in the two fuels. Diesel fuel is a denser fuel and, therefore, has more BTU per gallon than does gasoline. On the basis of miles per million BTU, the diesel is 29 percent instead of 47 percent better than the gasoline engine in this particular comparison.

To conclude from Figure 32 that using small trucks would improve the total fuel consumed would be an erroneous interpretation of the data. The usefulness of a truck is determined by its ability to carry a payload. Thus, ton-miles/gallon is a more appropriate measure of fuel economy for a truck. Table 29 shows the fuel economy in ton-miles/gallon for the three groups of trucks tested.

Using the fuel economy value based on tons of test weight, the average fuel economy for the precontrolled gasoline powered trucks was 43.7 ton-miles/gallon; for the controlled gasoline powered truck the average fuel

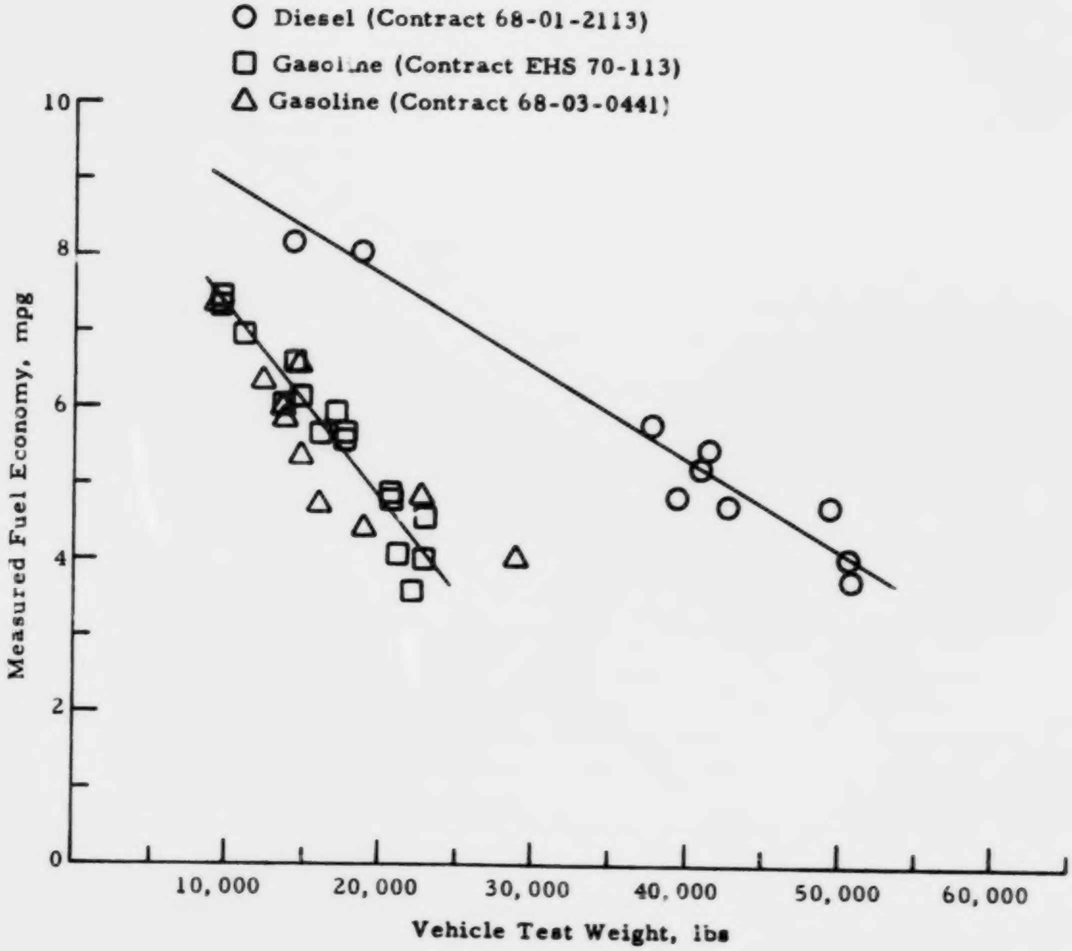

FIGURE 32. GASOLINE AND DIESEL TRUCK ROAD ROUTE FUEL ECONOMY IN MILES PER GALLON AS A FUNCTION OF VEHICLE TEST WEIGHT

economy was 44.2 ton-miles/gallon. This method of expressing fuel economy also shows that there is essentially no difference in fuel economy between the precontrolled and controlled gasoline powered trucks, just as was shown using fuel economy in miles per gallon. The average fuel economies of diesel and gasoline powered trucks in ton-miles per gallon are 97.8 and 44.0 (average of all 35 trucks), respectively. Thus, in terms of ton-miles per gallon, the diesel trucks show a significantly better fuel economy than the gasoline powered trucks, whereas in terms of miles per gallon, the diesel trucks appeared to have slightly poorer fuel economy.

From Table 29, it appears that fuel economy in ton-miles/gallon may still be a function of vehicle weight, improving as vehicle weight increases. Figure 33 is a plot of fuel economy in ton-miles per gallon as a function of vehicle test weight. The graph clearly indicates that fuel economy in ton-miles per gallon is a function of vehicle weight and that the larger weight vehicles use fuel more economically than smaller trucks. Much more information could be obtained with this fuel economy graph in conjunction with the Figure 33 plot of payload to GVW ratio. However, such analysis is beyond the scope of this study. The important point here is that fuel economy in ton-miles/gallon leads to conclusions that are compatible with the intuitive feeling that it is more economical from a fuel standpoint to use one big truck than several little ones.

As a final use of the fuel consumption information from the road tests, this data was compared with the chassis dynamoneter tests performed on the trucks. This comparison is presented in Table 30. The gasoline powered truck comparison was done on a pounds of fuel per test basis. This was possible since the dynamometer test and road test lasted approximately the same amount of time and the dynamometer test schedule yielded a self-weighted fuel consumption simply by measuring the fuel used during the test. The diesel powered trucks were compared on a fuel rate, lbs/hr, rather than simply total amount of fuel consumed per test. The fuel rate from the chassis dynamometer tests is a cycle weighted composite fuel rate.

The chassis dynamometer tests again show no difference between the precontrolled and controlled gasoline powered trucks. The ratio of the average chassis to road fuel consumption of the gasoline trucks is also essentially equal for both the precontrolled and controlled trucks. Apparently, on an average, the chassis test of the gasoline powered trucks requires less fuel than the road test of approximately equal time. The diesel trucks show the opposite trend with the road tests requiring less fuel per unit time than the chassis test. This gives a rough indication of the overall severity of the dynamometer driving test duty cycle for both types of engines relative to the road driving severity level. It is also useful in explaining variations in certain emissions, specifically NO_x, between dynamometer and road operation.

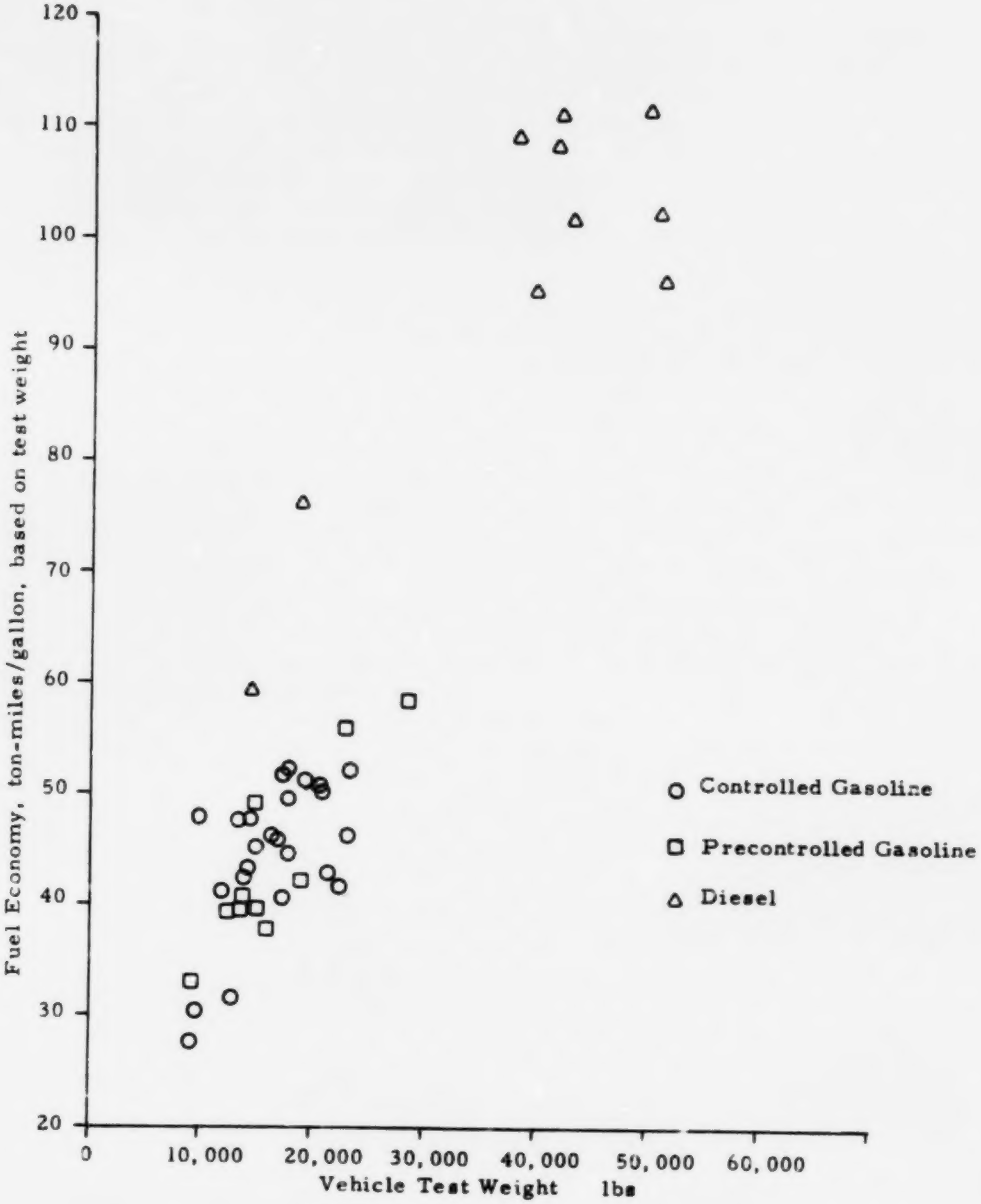

FIGURE 33. GASOLINE AND DIESEL TRUCK ROAD ROUTE FUEL ECONOMY IN TON-MILES/GALLON AS A FUNCTION OF VEHICLE TEST WEIGHT

TABLE 30. COMPARISON OF FUEL CONSUMPTION FOR PRECONTROLLED GASOLINE, CONTROLLED GASOLINE AND DIESEL POWERED TRUCKS OPERATED OVER THE SARR

	10 Uncontrolled Gasoline Trucks	25 Controlled Gasoline Trucks	All 35 Gasoline Trucks	10 Diesel Trucks
1. Chassis Dynamometer Tests (9 mode gasoline or 13 mode diesel)				
fuel consumption, lbs	6.36	6.36	6.36	-
composite fuel rate, lbs/hr	19.08	19.08	19.08	38.38
2. Road Tests				
fuel consumption, lbs	8.43	8.12	8.21	-
fuel rate, lbs/hr	-	-	-	26.62
3. Ratio, Chassis/Road				
fuel consumption, lbs/lb	0.77	0.80	0.79	
fuel rate $\frac{(lb/hr)}{(lb/hr)}$	-	-	-	1.45

In summary, a great deal of vehicle/engine performance data was gathered on the road during the course of the studies of these three groups of trucks. Only the highlights have been presented in this section. For more detailed information, the reader is referred to the final contract report for each of the individual truck groups previously referenced.

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APPENDIX A

SUMMARY OF EMISSION RESULTS FROM INDIVIDUAL ROAD TESTS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS

TABLE A-1. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G-1, 1967 FORD 330 CID V8, 17000 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE HC	GRAMS PER MINUTE CO	GRAMS PER MINUTE NOX	GRAMS PER LB OF FUEL HC	GRAMS PER LB OF FUEL CO	GRAMS PER LB OF FUEL NOX	GRAMS PER MILE HC	GRAMS PER MILE CO	GRAMS PER MILE NOX	FUEL WT LB	MILES PER GAL
7-19-79	1	TLC	19.44	9.03	79.37	2.39	23.57	207.04	6.25	24.31	213.62	6.44	7.47	6.04
7-19-79	2	TLC	20.22	7.99	81.05	1.94	23.28	247.83	5.65	22.32	237.56	5.41	6.94	6.50
7-19-79	3	TLC	20.96	7.57	90.34	1.98	22.15	269.42	5.81	21.91	261.50	5.74	7.16	6.30
7-19-79	4	ARL	21.69	8.69	87.91	1.94	26.26	267.02	5.90	25.89	263.34	5.82	7.14	6.32
7-19-79	5	ARL	19.39	9.05	79.16	2.28	25.30	207.19	6.38	24.25	198.60	6.11	6.99	6.50
7-19-79	6	ARL	21.87	8.13	86.27	1.97	24.63	261.35	5.96	24.56	260.63	5.94	7.22	6.25
7-19-79	7	RKH	19.77	8.95	75.44	2.29	23.36	208.60	6.32	23.07	206.01	6.24	7.15	6.31
7-19-79	9	RKH	21.66	8.37	85.65	1.90	27.11	277.30	6.16	25.05	256.24	5.70	6.69	6.75
OVERALL AVERAGE			20.63	8.41	83.02	2.09	24.46	242.59	6.05	23.92	237.19	5.93	7.09	6.37
DRIVER TLC AVERAGE			20.22	8.20	84.92	2.11	23.00	239.76	5.90	22.85	237.56	5.87	7.19	6.28
DRIVER ARL AVERAGE			20.98	8.61	82.78	2.06	25.39	245.19	6.08	24.90	240.86	5.96	7.10	6.36
DRIVER RKH AVERAGE			20.72	8.91	80.54	2.10	25.23	242.95	6.24	24.06	231.12	5.97	6.92	6.53

TABLE A-2. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G2, 1968 INTERNATIONAL 304 CID V8, 14200 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE HC	GRAMS PER MINUTE CO	GRAMS PER MINUTE NOX	GRAMS PER LB OF FUEL HC	GRAMS PER LB OF FUEL CO	GRAMS PER LB OF FUEL NOX	GRAMS PER MILE HC	GRAMS PER MILE CO	GRAMS PER MILE NOX	FUEL WT LB	MILES PER GAL
8- 1-79	1	EMK	20.87	10.77	88.08	1.94	28.97	236.93	5.21	29.77	243.52	5.36	7.76	6.07
8- 1-79	2	EMK	20.30	8.81	82.25	1.89	25.31	236.21	5.27	23.70	221.14	4.93	7.07	6.65
8- 1-79	4	RKH	25.38	6.59	67.96	1.91	24.27	246.42	5.10	22.51	228.47	4.73	7.00	6.72
8- 1-79	5	RKH	20.96	6.65	78.26	1.78	19.59	230.41	5.23	18.17	217.29	4.93	7.12	6.61
8- 1-79	6	RKH	22.78	6.90	81.13	1.95	20.78	244.93	5.86	20.41	244.26	5.88	7.56	6.23
8- 1-79	7	TLC	23.76	5.74	67.64	2.16	19.07	224.76	7.17	14.16	212.44	6.74	7.15	6.58
8- 1-79	8	TLC	21.82	6.95	79.86	1.88	20.61	239.16	6.02	18.65	216.35	5.45	6.83	6.89
8- 1-79	9	TLC	21.69	6.13	69.80	2.16	19.65	223.65	6.44	17.62	200.54	6.22	6.77	[illegible]
OVERALL AVERAGE			22.20	7.27	76.25	1.89	22.24	235.25	5.85	21.20	224.12	5.54	7.16	6.59
DRIVER EMK AVERAGE			20.59	9.79	85.17	1.89	27.14	236.57	5.24	26.74	232.36	5.15	7.41	6.36
DRIVER RKH AVERAGE			23.04	6.75	75.78	1.71	21.55	240.42	5.40	[illegible]	241.17	5.15	7.23	6.52
DRIVER TLC AVERAGE			22.42	6.11	70.77	2.07	19.78	229.19	6.71	16.81	209.42	6.15	6.92	6.61

TABLE A-3. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G3, 1967 FORD 300 CID I6, 10000 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
8-12-79	1	EMK	20.03	3.83	73.09	2.87	12.33	235.99	9.29	10.60	202.27	7.99	6.22	7.26
8-12-79	2	EMK	19.96	4.16	79.96	2.53	13.89	247.96	8.41	11.18	200.35	6.80	5.85	7.72
8-12-79	3	EMK	22.62	3.81	71.17	2.33	13.23	247.29	8.09	11.89	222.36	7.27	6.51	6.93
8-12-79	4	TLC	21.23	2.98	76.63	3.09	9.72	249.50	10.06	8.75	229.69	9.06	6.52	6.92
8-13-79	6	TLC	21.08	3.19	68.73	2.81	11.07	238.79	9.78	9.28	200.16	8.20	6.07	7.99
8-13-79	7	RKM	19.79	3.33	73.89	2.69	10.97	232.53	8.96	9.09	202.02	7.37	6.29	7.18
8-13-79	8	RKM	18.13	3.67	73.90	2.71	11.52	237.15	8.75	8.93	183.76	6.78	5.61	8.05
8-13-79	9	RKM	19.95	4.01	78.03	2.56	13.09	254.72	6.39	11.05	219.97	7.09	6.11	7.39
OVERALL AVERAGE			20.29	3.61	73.68	2.70	11.91	242.92	8.89	10.10	206.32	7.56	6.15	7.36
DRIVER EMK AVERAGE			20.71	3.93	72.91	2.57	13.13	243.56	8.58	11.22	208.23	7.39	6.19	7.30
DRIVER TLC AVERAGE			21.16	3.08	72.68	2.95	10.39	244.12	9.92	9.01	212.93	8.63	6.29	7.18
DRIVER RKM AVERAGE			19.29	3.63	75.10	2.65	11.69	241.97	8.52	9.69	200.25	7.06	6.00	7.59

TABLE A-4. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G4, 1969 CHEVROLET 350 CID V8, 18000 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
8-21-79	1	EMK	18.17	12.06	79.19	1.90	29.92	193.17	4.69	30.27	198.77	4.77	7.45	6.06
8-21-79	2	EMK	18.87	12.11	82.06	2.01	31.22	211.52	5.17	31.57	213.86	5.23	7.32	6.17
8-21-79	3	EMK	18.89	12.10	79.90	2.01	32.02	210.10	5.31	31.50	207.20	5.24	7.19	6.32
8-21-79	4	TLC	20.79	11.34	83.91	2.00	29.16	215.88	5.16	32.55	240.93	5.75	8.08	5.59
8-21-79	5	TLC	21.46	11.37	72.21	2.27	30.88	196.16	6.17	33.69	219.09	6.79	7.90	5.71
8-21-79	6	TLC	19.06	12.17	88.02	2.87	28.25	204.30	6.65	32.09	231.67	7.59	8.21	5.50
8-21-79	7	RKM	18.81	11.99	88.33	1.97	28.33	217.75	4.85	29.86	229.48	5.11	7.63	5.92
8-21-79	8	RKM	20.29	10.86	75.85	2.92	28.20	196.88	6.28	30.38	212.10	6.76	7.80	5.79
8-21-79	9	RKM	17.78	11.61	83.08	2.90	28.79	205.72	5.95	28.50	209.01	5.90	7.18	6.29
OVERALL AVERAGE			19.34	11.68	81.39	2.21	29.58	205.72	5.58	31.16	216.90	5.90	7.63	5.93
DRIVER EMK AVERAGE			18.64	12.09	80.22	1.97	30.89	204.93	5.09	31.14	206.61	5.08	7.30	6.18
DRIVER TLC AVERAGE			20.43	11.62	81.38	2.38	29.43	205.45	5.99	32.76	228.88	6.68	8.06	5.60
DRIVER RKM AVERAGE			18.96	11.32	82.92	2.26	28.42	206.78	5.69	29.58	215.20	5.93	7.59	6.00

TABLE A-5. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 55, 1962 DODGE   318 CID V8, 19500 LB. GVW, STAKE BED

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
8-29-74	1	EMK	22.17	9.16	94.93	.85	25.20	261.11	2.34	28.06	290.69	2.61	8.06	5.60
8-29-74	2	EMK	19.92	9.58	103.68	1.07	23.92	258.78	2.67	26.37	285.23	2.95	7.98	5.66
8-29-74	3	EMK	18.57	10.30	112.54	.87	25.38	277.22	2.15	26.93	288.71	2.24	7.54	5.99
8-29-74	4	JMM	20.48	8.39	91.83	1.49	22.51	246.47	3.98	23.73	259.75	4.20	7.63	5.92
8-29-74	5	JMM	18.54	9.56	107.49	1.17	23.41	263.21	2.85	24.48	275.20	2.98	7.57	5.96
8-29-74	6	JMM	19.01	9.50	91.66	1.67	24.03	231.99	4.24	24.93	240.64	4.40	7.51	6.01
OVERALL AVERAGE			19.78	9.42	100.35	1.19	24.08	256.46	3.04	25.67	273.37	3.23	7.71	5.86
DRIVER EMK AVERAGE			20.22	9.68	103.72	.93	24.84	265.70	2.39	26.95	288.21	2.60	7.86	5.75
DRIVER JMM AVERAGE			19.34	9.15	96.99	1.44	23.32	247.22	3.69	24.38	258.53	3.86	7.57	5.96

TABLE A-6. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 56, 1968 INTERNATIONAL   345 CID V8, 27500 LB. GVW, DUMP TRUCK

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
9-10-74	2	EMK	21.88	6.57	75.85	2.52	14.61	168.67	5.61	19.86	229.24	7.63	9.84	4.59
9-10-74	1	EMK	20.42	7.70	71.55	2.75	15.52	144.23	5.55	21.71	201.80	7.76	10.13	4.46
9-10-74	4	GEM	23.24	5.47	71.22	2.70	11.79	153.42	5.81	17.57	224.64	8.65	10.79	4.18
9-10-74	5	GEM	19.34	5.75	81.17	3.03	10.47	148.18	5.52	15.63	224.11	8.34	10.45	4.12
9-10-74	6	GEM	22.40	5.71	77.63	2.20	11.56	157.07	4.45	17.60	239.08	6.78	11.02	4.10
9-11-74	7	EMK	21.41	6.47	85.26	2.12	14.45	176.68	4.90	20.62	252.04	6.24	10.33	4.37
9-11-74	8	RRM	19.82	5.41	61.28	2.39	11.93	135.09	5.16	14.81	167.24	6.41	8.49	5.02
9-11-74	9	RRM	19.43	5.04	75.82	2.54	10.00	150.34	5.01	13.53	203.44	6.78	9.80	4.61
9-11-74	10	RRM	19.81	5.20	76.74	2.46	10.29	151.85	4.87	14.24	210.16	6.74	10.02	4.51
OVERALL AVERAGE			20.42	5.94	75.20	2.52	12.24	153.95	5.15	17.31	217.37	7.26	10.21	4.44
DRIVER EMK AVERAGE			21.24	7.04	77.55	2.47	14.86	163.14	5.19	20.23	227.71	7.22	10.10	4.47
DRIVER GEM AVERAGE			21.43	5.64	76.74	2.64	11.27	152.84	5.26	17.00	230.61	7.93	10.42	4.13
DRIVER RRM AVERAGE			19.69	5.22	71.40	2.44	10.74	145.26	5.01	14.19	194.80	6.64	9.60	4.71

TABLE A-7. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 67, 1965 CHEVROLET 292 CID I6, 19500 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
9-18-79	1	EMK	19.48	9.13	140.22	1.33	18.41	282.70	2.67	24.57	377.20	3.57	9.66	4.67
9-18-79	2	EMK	21.87	6.60	112.21	1.12	16.69	283.73	2.84	19.93	338.99	3.39	8.65	5.22
9-18-79	3	EMK	19.08	7.02	118.46	1.28	15.64	264.03	2.84	18.49	312.17	3.36	8.56	5.27
9-18-79	4	GEM	19.84	7.34	117.14	1.28	16.53	263.82	2.89	20.12	321.09	3.51	8.81	5.12
9-18-79	5	GEM	19.67	7.75	113.72	1.30	19.00	278.88	3.18	21.05	308.93	3.52	8.02	5.63
9-19-79	8	RKH	18.31	7.40	124.75	1.33	15.25	257.18	2.74	18.70	315.44	3.36	8.88	5.08
9-19-79	9	RKH	17.48	6.84	115.00	.99	15.45	259.72	2.24	16.52	277.66	2.40	7.74	5.83
9-19-79	10	GEM	17.06	7.48	123.67	1.24	16.93	280.13	2.80	17.61	291.35	2.91	7.53	5.99
OVERALL AVERAGE			19.10	7.44	120.65	1.23	16.74	271.28	2.77	19.62	317.85	3.25	8.48	5.35
DRIVER EMK AVERAGE			20.14	7.58	123.63	1.24	16.91	276.82	2.78	21.00	342.79	3.44	8.96	5.06
DRIVER GEM AVERAGE			18.86	7.52	118.18	1.27	17.49	274.28	2.96	19.59	307.10	3.32	8.12	5.58
DRIVER RKH AVERAGE			17.89	7.12	119.88	1.16	15.35	258.45	2.49	17.61	296.55	2.88	8.31	5.46

TABLE A-8. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 68, 1965 GMC 351 CID V6, 19500 LB. GVW, MOVING VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
10- 2-79	4	ERK	24.32	29.58	75.70	2.32	24.62	190.95	5.85	99.36	254.25	7.79	9.64	4.68
10- 2-79	5	ERK	22.98	29.41	74.85	2.23	25.09	191.13	5.70	93.35	237.59	7.08	9.00	5.02
10- 2-79	6	ERK	23.90	29.04	74.97	2.19	23.23	189.05	5.51	95.89	247.54	7.22	9.48	4.76
10- 2-79	8	GEM	21.77	33.20	81.72	1.95	23.38	186.63	4.30	99.83	245.75	5.85	9.85	4.58
10- 3-79	9	GEM	21.75	33.40	82.56	1.89	26.63	[illegible]	4.34	100.34	248.06	5.66	9.46	4.76
10- 3-79	10	GEM	24.65	28.51	71.52	1.83	24.30	[illegible]	4.78	97.08	243.54	6.25	9.46	4.77
10- 3-79	11	GEM	23.93	31.86	80.28	1.85	29.09	199.28	4.59	105.30	265.34	6.11	9.64	4.68
10- 3-79	12	RKH	22.71	32.99	74.96	2.49	27.88	176.96	5.89	103.96	235.13	7.81	9.62	4.69
10- 3-79	14	RKH	22.71	34.15	84.09	2.35	31.15	199.81	5.57	107.15	263.84	7.36	9.56	4.72
OVERALL AVERAGE			23.19	31.35	77.85	2.12	26.15	189.23	5.17	100.26	249.00	6.80	9.53	4.74
DRIVER ERK AVERAGE			23.73	29.34	75.17	2.25	24.31	190.38	5.69	96.20	246.46	7.36	9.37	4.82
DRIVER GEM AVERAGE			23.03	31.74	79.02	1.88	25.85	188.44	4.50	100.64	250.67	5.97	9.61	4.70
DRIVER RKH AVERAGE			22.71	33.57	79.53	2.42	29.51	188.39	5.73	105.42	249.49	7.59	9.59	4.71

TABLE A-9. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G9, 1966 CHEVROLET 366 CID V8, 34000 LB. GVW, TRACTOR

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
10- 9-74	1	EMK	22.33	27.23	54.39	4.08	69.41	138.63	10.40	83.99	167.74	12.59	8.76	5.15
10- 9-74	2	ERK	23.77	28.79	53.40	3.80	69.41	128.74	9.17	94.53	175.32	12.49	9.86	4.58
10- 9-74	3	ERK	24.47	26.77	52.26	4.08	68.60	133.90	10.47	90.49	176.63	13.80	9.55	4.73
10- 9-74	4	GEM	20.31	27.13	63.30	3.59	65.05	151.78	8.60	76.10	177.57	10.06	8.47	5.33
10- 9-74	5	GEM	24.69	22.54	56.75	3.48	63.04	158.68	9.72	76.89	193.53	11.86	8.83	5.11
10- 9-74	6	GEM	22.92	24.43	57.78	3.66	62.07	146.82	9.30	77.33	182.92	11.59	9.02	5.00
10- 9-74	7	RKH	25.40	24.19	50.94	3.68	62.89	132.45	9.57	84.87	178.73	12.91	9.77	4.62
10- 9-74	8	RKH	21.63	28.11	64.76	3.76	70.86	163.24	9.49	83.98	193.46	11.24	8.58	5.26
10- 9-74	9	RKH	26.61	23.36	50.18	3.33	64.09	137.65	9.13	85.86	184.41	12.24	9.70	4.65
OVERALL AVERAGE			23.57	25.84	55.97	3.72	66.16	143.54	9.54	83.78	181.15	12.09	9.17	4.94
DRIVER EMK AVERAGE			22.33	27.23	54.39	4.08	69.41	138.63	10.40	83.99	167.74	12.59	8.76	5.15
DRIVER ERK AVERAGE			24.12	27.78	52.83	3.94	69.00	131.32	9.82	92.51	175.98	13.15	9.70	4.66
DRIVER GEM AVERAGE			22.64	24.70	59.28	3.57	63.39	152.43	9.21	76.77	184.67	11.17	8.77	5.15
DRIVER RKH AVERAGE			24.55	25.22	55.29	3.59	65.95	144.45	9.40	84.90	185.53	12.13	9.35	4.85

TABLE A-10. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G10, 1969 FORD 391 CID V8, 43500 LB. GVW, TRACTOR

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			GRAMS PER MILE			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX	HC	CO	NOX		
10-16-74	1	E[illegible]K	24.45	6.48	84.00	3.16	13.63	176.58	6.64	21.90	283.65	10.67	11.63	3.88
10-16-74	2	E[illegible]K	22.64	6.87	78.97	3.17	14.22	163.44	6.56	21.49	246.97	9.92	10.94	4.13
10-16-74	3	E[illegible]K	22.33	6.68	78.29	3.18	13.82	161.90	6.58	20.62	241.51	9.82	10.80	4.18
10-16-74	4	GEM	25.78	6.77	78.78	3.26	14.66	170.54	7.07	24.12	280.55	11.62	11.91	3.79
10-16-74	[illegible]	GEM	24.80	7.03	76.89	3.10	15.87	173.66	7.00	24.07	263.37	10.62	10.98	4.11
10-16-74	7	RKH	22.17	5.40	85.18	3.45	10.74	169.40	6.86	16.54	260.89	10.57	11.15	4.05
10-16-74	8	RKH	23.53	6.88	83.15	3.38	13.95	168.70	6.85	22.36	270.29	10.97	11.60	3.89
10-16-74	9	RKH	21.33	5.17	82.65	3.37	10.46	167.23	6.81	15.22	243.46	9.92	10.54	4.28
OVERALL AVERAGE			23.38	6.41	80.99	3.26	13.42	168.93	6.80	20.79	261.34	10.51	11.19	4.04
DRIVER E[illegible]K AVERAGE			23.14	6.68	80.42	3.17	13.89	167.31	6.59	21.33	257.38	10.13	11.12	4.06
DRIVER GEM AVERAGE			25.29	6.90	77.84	3.18	15.27	172.10	7.03	24.09	271.96	11.12	11.44	3.95
DRIVER RKH AVERAGE			22.34	5.82	83.66	3.40	11.72	168.44	6.84	18.04	258.21	10.49	11.10	4.07

APPENDIX B

SUMMARY OF EMISSION RESULTS FROM INDIVIDUAL NINE-MODE FTP TESTS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS

		Emissions		
Test Date	Run Number	HC, ppm	CO, percent	Corrected NO, ppm
		Truck G-1		
7-18-74	1	417	4.55	1178
7-18-74	2	379	4.57	1091
	Average	398	4.56	1135
		Truck G-2		
7-31-74	1	468	2.75	1493
7-31-74	2	448	2.84	1448
	Average	458	2.79	1471
		Truck G-3		
8-9-74	1	336	3.73	1452
8-9-74	3	319	3.86	1570
	Average	328	3.80	1511
		Truck G-4		
8-20-74	1	496	4.53	889
8-20-74	2	450	4.31	958
	Average	473	4.42	924
		Truck G-5		
8-28-74	4	608	4.30	1255
8-28-74	5	522	4.00	1302
	Average	565	4.15	1279
		Truck G-6		
9-9-74	1	167	0.93	833
9-9-74	2	152	0.92	863
	Average	160	0.93	848
		Truck G-7		
9-17-74	1	295	4.39	1149
9-17-74	2	280	4.35	1164
	Average	288	4.37	1157
		Truck G-8		
10-1-74	1	380	3.41	1140
10-1-74	2	400	3.57	1154
	Average	390	3.49	1147
		Truck G-9		
10-8-74	1	388	1.99	1707
10-8-74	2	379	1.87	1689
	Average	384	1.93	1698
		Truck G-10		
10-15-74	1	272	4.67	645
10-15-74	2	295	4.66	616
	Average	284	4.66	631

APPENDIX C. SUMMARY OF CVS MASS EMISSION RESULTS FROM INDIVIDUAL NINE-MODE FTP TESTS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS

TABLE C-1. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO, G1, 1967 FORD 330 CID V8, 17000 LB, GVW, VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
7-18-79	1	JC	20,01	6,98	84,11	2,32	19,54	253,45	6,99	6,64	,94
7-18-79	2	TLC	20,00	6,90	83,07	2,29	19,66	265,20	7,04	6,51	,96
OVERALL AVERAGE			20,00	6,94	83,59	2,31	19,60	259,33	7,02	6,58	,95

TABLE C-2. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO, G-2, 1968 INTERNATIONAL 304 CID V8, 18200 LB, GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
7-31-79	1	ARL	20,00	8,00	45,63	2,78	26,41	150,58	9,16	6,06	1,03
7-21-79	2	ARL	20,00	6,37	48,53	2,81	22,75	173,35	10,05	5,60	1,11
OVERALL AVERAGE			20,00	7,19	47,08	2,80	24,58	161,97	9,61	5,83	1,07
DRIVER ARL AVERAGE			20,00	7,19	47,08	2,80	24,58	161,97	9,61	5,83	1,07

TABLE C-3. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G3, 1967 FORD 300 CID I6, 10000 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
8- 9-79	1	JGC	20.12	3.90	62.09	2.65	13.15	209.61	8.94	5.96	1.05
8- 9-79	3	JGC	19.91	4.00	64.17	2.98	13.69	219.52	10.21	5.82	1.07
OVERALL AVERAGE			20.02	3.95	63.13	2.82	13.42	214.57	9.58	5.89	1.06
DRIVER JGC AVERAGE			20.02	3.95	63.13	2.82	13.42	214.57	9.58	5.89	1.06

TABLE C-4. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G4, 1969 CHEVROLET 350 CID V8, 18000 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
8-20-74	1	TLC	20.00	10.26	69.95	2.79	26.77	182.43	7.27	7.67	.81
8-20-74	2	TLC	20.00	9.71	69.58	2.11	27.19	194.87	5.90	7.19	.87
OVERALL AVERAGE			20.00	9.99	69.76	2.45	26.98	188.65	6.58	7.40	.84
DRIVER TLC AVERAGE			20.00	9.99	69.76	2.45	26.98	188.65	6.58	7.40	.84

TABLE C-5. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G5, 1967 DODGE 318 CID V8, 19500 LB. GVW, STAKE BED

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
8-29-74	4	EMK	19.99	5.48	71.78	1.66	19.92	254.49	5.89	5.64	1.11
8-28-74	5	EMK	19.80	4.83	64.89	1.98	17.45	241.07	7.36	5.33	1.17
OVERALL AVERAGE			19.90	5.15	68.34	1.82	18.68	247.78	6.62	5.48	1.14
DRIVER EMK AVERAGE			19.90	5.15	68.34	1.82	18.68	247.78	6.62	5.48	1.14

TABLE C-6. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. G6, 1968 INTERNATIONAL 345 CID V8, 27500 LB. GVW, DUMP TRUCK

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
9- 9-74	1	EMK	20.00	1.53	16.93	1.82	5.51	61.11	6.56	5.59	1.13
9- 9-74	2	EMK	19.99	1.47	16.64	1.94	5.15	58.27	6.78	5.71	1.09
OVERALL AVERAGE			20.00	1.50	16.78	1.88	5.33	59.69	6.67	5.65	1.11
DRIVER EMK AVERAGE			20.00	1.50	16.78	1.88	5.33	59.69	6.67	5.65	1.11

TABLE C-7. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 67, 1965 CHEVROLET 292 CID I6, 19500 LB. GVW, BOX VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
9-17-79	2	EMK	19.99	3.08	65.75	1.75	11.13	237.74	6.32	5.54	1.13
9-17-79	2	EMK	20.01	3.10	69.93	1.86	11.34	255.35	6.78	5.98	1.19
OVERALL AVERAGE			20.00	3.09	67.84	1.80	11.24	246.55	6.55	5.50	1.13
DRIVER EMK AVERAGE			20.00	3.09	67.84	1.80	11.24	246.55	6.55	5.50	1.13

TABLE C-8. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 68, 1965 GMC 351 CID V6, 19500 LB. GVW, MOVING VAN

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
10- 1-79	1	EMK	20.09	5.22	69.55	2.95	13.62	181.53	6.38	7.68	.81
10- 1-79	2	ERK	19.99	5.29	71.55	2.93	14.90	201.48	6.83	7.10	.88
OVERALL AVERAGE			20.02	5.25	70.55	2.94	14.26	191.51	6.61	7.39	.85

TABLE C-9. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE
TRUCK NO. 69, 1966 CHEVROLET 366 CID V8, 39000 LB. GVW, TRACTOR

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
10- 8-79	1	ERK	20.01	4.91	38.50	4.16	14.18	111.16	12.01	6.93	.90
10- 8-79	2	ERK	20.01	4.82	36.15	4.06	14.85	111.45	12.53	6.49	.96
OVERALL AVERAGE			20.01	4.86	37.32	4.11	14.52	111.31	12.27	6.71	.93
DRIVER ERK AVERAGE			20.01	4.86	37.32	4.11	14.52	111.31	12.27	6.71	.93

TABLE C-10. EXHAUST EMISSIONS SUMMARY, SAN ANTONIO ROAD ROUTE

TRUCK NO. G10 1969 FORD 391 CID V8, 43500 LB. GVW, TRACTOR

DATE	RUN	DRIVER	RUN DURATION MINUTES	GRAMS PER MINUTE			GRAMS PER LB OF FUEL			FUEL WT LB	MILES PER GAL
				HC	CO	NOX	HC	CO	NOX		
10-15-79	1	EHK	20.00	3.69	83.70	1.56	9.90	229.75	9.19	7.45	.84
10-15-79	2	EHK	20.01	3.74	84.30	1.56	10.69	241.31	9.47	6.99	.89
OVERALL AVERAGE			20.01	3.71	84.00	1.56	10.30	233.03	9.33	7.22	.86
DRIVER EHK AVERAGE			20.01	3.71	84.00	1.56	10.30	233.03	9.33	7.22	.86

APPENDIX D

PERCENT OF TIME IN VARIOUS INCREMENTS OF VEHICLE SPEED, ENGINE SPEED, AND MANIFOLD VACUUM FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS

ENGINE SPEED, RPM AS A FUNCTION OF TIME

TABLE D-1.

1967 FORD BOX VAN WITH 330 CID V8. 17000 LB GVW. TEST WT. 12400 LB.
Truck G-1
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.01	.02	8	.06	.00
200. - 400.	.00	.05	8	.14	.00
400. - 600.	5.68	2.43	8	9.74	1.19
600. - 800.	16.95	2.63	8	21.19	11.94
800. - 1000.	4.30	1.26	8	6.87	2.74
1000. - 1200.	6.98	.72	8	7.77	5.57
1200. - 1400.	9.27	1.88	8	12.45	6.96
1400. - 1600.	11.72	1.69	8	14.77	10.07
1600. - 1800.	14.19	1.34	8	16.18	12.08
1800. - 2000.	10.74	1.04	8	11.91	9.15
2000. - 2200.	4.63	1.36	8	7.64	3.49
2200. - 2400.	2.85	.83	8	3.89	2.02
2400. - 2600.	3.78	1.61	8	6.08	1.61
2600. - 2800.	3.96	1.70	8	6.39	1.82
2800. - 3000.	3.49	1.94	8	6.47	.71
3000. - 3200.	1.17	1.34	8	3.69	.00
3200. - 3400.	.13	.14	8	.40	.00
3400. - 3600.	.03	.06	8	.16	.00
3600. - 3800.	.01	.01	8	.03	.00
3800. - 4000.	.00	.01	8	.02	.00
4000. - 4200.	.01	.02	8	.05	.00
4200. - 4400.	.00	.01	8	.04	.00
4400. - 4600.	.00	.01	8	.04	.00
4600. - 4800.	.00	.00	8	.00	.00
4800. - 5000.	.00	.00	8	.00	.00

TABLE D-2.

1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB.

Truck G-2
VARIABLE : Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.81	1.96	6	4.82	.00
200. - 400.	.45	1.10	6	2.70	.00
400. - 600.	2.68	6.13	6	15.18	.04
600. - 800.	8.43	5.38	6	16.16	2.16
800. - 1000.	12.30	4.37	6	17.78	5.53
1000. - 1200.	4.92	1.75	6	7.94	3.44
1200. - 1400.	6.95	1.69	6	8.93	4.26
1400. - 1600.	9.44	2.17	6	11.91	6.43
1600. - 1800.	12.39	1.98	6	14.57	10.00
1800. - 2000.	11.41	2.26	6	12.88	6.95
2000. - 2200.	8.41	3.24	6	11.60	3.40
2200. - 2400.	5.44	3.04	6	10.94	2.27
2400. - 2600.	3.54	.88	6	5.13	2.49
2600. - 2800.	3.31	1.21	6	5.39	1.96
2800. - 3000.	2.90	.76	6	3.59	1.56
3000. - 3200.	2.67	1.46	6	4.57	.71
3200. - 3400.	2.55	1.92	6	5.10	.13
3400. - 3600.	.85	1.15	6	2.94	.00
3600. - 3800.	.39	.79	6	2.00	.00
3800. - 4000.	.10	.13	6	.31	.00
4000. - 4200.	.03	.05	6	.10	.00
4200. - 4400.	.01	.02	6	.04	.00
4400. - 4600.	.00	.00	6	.00	.00
4600. - 4800.	.00	.00	6	.00	.00
4800. - 5000.	.00	.00	6	.00	.00

TABLE D-3.

1967 FORD BOX VAN WITH 300 CID I6. 10000LB. GVW,TEST WT.9140 LB.
Truck G-3
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.07	.15	8	.44	.00
200. - 400.	.10	.27	8	.77	.00
400. - 600.	15.45	6.23	8	24.01	7.45
600. - 800.	10.30	2.41	8	12.86	6.63
800. - 1000.	5.20	1.10	8	7.08	3.70
1000. - 1200.	6.90	1.87	8	10.43	3.96
1200. - 1400.	7.58	1.62	8	10.69	4.94
1400. - 1600.	10.88	1.99	8	13.97	8.60
1600. - 1800.	12.70	1.83	8	16.39	10.37
1800. - 2000.	10.76	2.48	8	13.95	7.58
2000. - 2200.	5.78	2.00	8	8.70	2.73
2200. - 2400.	3.14	1.71	8	5.23	.79
2400. - 2600.	2.03	1.50	8	5.10	.85
2600. - 2800.	2.71	1.65	8	4.59	.60
2800. - 3000.	3.01	2.40	8	7.02	.25
3000. - 3200.	2.09	2.18	8	6.33	.16
3200. - 3400.	.68	1.18	8	3.02	.00
3400. - 3600.	.10	.23	8	.67	.00
3600. - 3800.	.04	.07	8	.20	.00
3800. - 4000.	.04	.08	8	.21	.00
4000. - 4200.	.07	.15	8	.42	.00
4200. - 4400.	.15	.30	8	.80	.00
4400. - 4600.	.10	.18	8	.44	.00
4600. - 4800.	.08	.14	8	.35	.00
4800. - 5000.	.05	.11	8	.31	.00

TABLE D-4.

1969 CHEV BOX VAN WITH 350 CID V8 18000LB. GVW TEST WT. 13475 LB.
Truck G-4
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.00	.00	9	.01	.00
200. - 400.	.02	.05	9	.14	.00
400. - 600.	.34	.29	9	1.02	.02
600. - 800.	13.03	2.78	9	18.33	9.86
800. - 1000.	5.63	2.79	9	11.20	2.20
1000. - 1200.	4.17	1.18	9	6.14	2.01
1200. - 1400.	6.13	1.99	9	9.05	3.69
1400. - 1600.	7.26	1.65	9	10.00	4.67
1600. - 1800.	9.70	3.18	9	14.14	5.68
1800. - 2000.	11.08	4.79	9	20.14	6.12
2000. - 2200.	11.11	1.49	9	14.50	9.24
2200. - 2400.	7.94	3.20	9	12.70	3.76
2400. - 2600.	4.85	2.61	9	10.07	1.67
2600. - 2800.	3.34	1.08	9	4.76	1.76
2800. - 3000.	4.08	1.40	9	6.32	2.58
3000. - 3200.	4.88	1.25	9	7.50	3.02
3200. - 3400.	3.36	2.51	9	7.76	.52
3400. - 3600.	2.32	2.07	9	5.91	.14
3600. - 3800.	.65	.59	9	1.42	.01
3800. - 4000.	.10	.09	9	.23	.00
4000. - 4200.	.03	.05	9	.16	.00
4200. - 4400.	.00	.00	9	.01	.00
4400. - 4600.	.00	.00	9	.01	.00
4600. - 4800.	.00	.00	9	.00	.00
4800. - 5000.	.00	.00	9	.01	.00

TABLE D-5.

1967 DODGE STAKE TK W/318 CID V8, 19500LB. GVW, TEST WT. 13875 LB.
Truck G-5
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.38	.72	6	1.83	.00
200. - 400.	3.30	3.00	6	7.21	.00
400. - 600.	13.08	4.27	6	17.93	6.63
600. - 800.	3.73	2.67	6	8.06	1.05
800. - 1000.	4.02	2.99	6	8.43	.90
1000. - 1200.	5.61	2.93	6	8.50	1.25
1200. - 1400.	8.45	3.44	6	11.99	3.76
1400. - 1600.	12.18	2.80	6	15.34	9.14
1600. - 1800.	13.15	2.46	6	15.96	10.19
1800. - 2000.	8.61	3.71	6	13.44	3.33
2000. - 2200.	5.69	3.54	6	10.71	2.87
2200. - 2400.	5.51	2.14	6	7.92	3.51
2400. - 2600.	5.39	1.52	6	7.05	3.22
2600. - 2800.	3.46	1.21	6	5.58	2.30
2800. - 3000.	3.22	2.75	6	7.71	.95
3000. - 3200.	2.38	2.77	6	6.81	.47
3200. - 3400.	1.10	1.19	6	3.33	.34
3400. - 3600.	.34	.18	6	.54	.00
3600. - 3800.	.32	.39	6	1.08	.00
3800. - 4000.	.08	.14	6	.36	.00
4000. - 4200.	.03	.07	6	.18	.00
4200. - 4400.	.00	.00	6	.00	.00
4400. - 4600.	.00	.00	6	.00	.00
4600. - 4800.	.00	.00	6	.00	.00
4800. - 5000.	.00	.00	6	.00	.00

TABLE D-6.

1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB
Truck G-6
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.84	1.24	9	3.27	.00
200. - 400.	1.31	2.06	9	5.21	.01
400. - 600.	12.50	12.24	9	43.93	3.38
600. - 800.	9.63	1.94	9	11.99	5.50
800. - 1000.	3.97	2.71	9	9.21	1.52
1000. - 1200.	4.69	1.81	9	6.87	1.89
1200. - 1400.	5.57	1.69	9	8.05	3.04
1400. - 1600.	7.74	4.31	9	18.43	3.36
1600. - 1800.	8.25	2.82	9	12.83	2.56
1600. - 2000.	9.07	3.55	9	14.33	3.83
2000. - 2200.	8.33	3.22	9	12.60	1.69
2200. - 2400.	7.22	3.62	9	12.10	1.46
2400. - 2600.	5.20	2.50	9	8.33	.97
2600. - 2800.	5.38	2.86	9	8.63	.89
2800. - 3000.	4.54	2.17	9	7.15	.91
3000. - 3200.	2.83	1.69	9	5.07	.61
3200. - 3400.	1.41	1.10	9	3.21	.24
3400. - 3600.	.64	.92	9	2.85	.06
3600. - 3800.	.35	.39	9	1.19	.00
3800. - 4000.	.17	.30	9	.83	.00
4000. - 4200.	.06	.10	9	.28	.00
4200. - 4400.	.02	.05	9	.16	.00
4400. - 4600.	.03	.07	9	.21	.00
4600. - 4800.	.03	.07	9	.22	.00
4800. - 5000.	.03	.08	9	.23	.00

TABLE D-7.

1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850
Truck G-7
VARIABLE : Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.01	.01	8	.04	.00
200. - 400.	.67	.59	8	1.61	.04
400. - 600.	12.03	4.13	6	18.50	7.05
600. - 800.	3.14	2.82	8	9.59	1.01
800. - 1000.	2.80	1.91	8	7.25	1.31
1000. - 1200.	5.35	1.95	8	7.88	2.69
1200. - 1400.	9.20	3.15	8	13.10	5.00
1400. - 1600.	11.54	2.56	8	16.10	8.61
1600. - 1800.	13.54	3.29	8	19.91	9.87
1800. - 2000.	12.01	3.46	8	16.87	7.02
2000. - 2200.	7.73	2.40	8	11.41	3.79
2200. - 2400.	4.32	1.29	8	5.84	2.46
2400. - 2600.	4.10	1.65	8	7.05	2.19
2600. - 2800.	5.93	1.51	8	8.26	4.04
2800. - 3000.	4.92	2.05	8	8.19	2.61
3000. - 3200.	1.77	2.39	8	7.38	.15
3200. - 3400.	.34	.56	8	1.66	.00
3400. - 3600.	.20	.46	8	1.32	.00
3600. - 3800.	.20	.46	8	1.32	.00
3800. - 4000.	.14	.30	8	.85	.00
4000. - 4200.	.05	.10	8	.27	.00
4200. - 4400.	.00	.00	8	.01	.00
4400. - 4600.	.00	.01	8	.02	.00
4600. - 4800.	.01	.01	8	.04	.00
4800. - 5000.	.00	.01	8	.02	.00

TABLE D-8.

1965 GMC BOX VAN WITH 351 CID V6, 19500 LB GVW, TEST WT. 16000 LB.
Truck G-8
VARIABLE : Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.01	.03	7	.08	.00
200. - 400.	2.19	1.88	7	4.91	.00
400. - 600.	5.04	2.54	7	8.37	1.73
600. - 800.	9.68	3.71	7	14.94	5.08
800. - 1000.	5.17	2.25	7	10.10	3.50
1000. - 1200.	10.60	4.21	7	16.41	6.48
1200. - 1400.	18.06	5.75	7	24.97	10.44
1400. - 1600.	17.84	2.29	7	20.49	15.18
1600. - 1800.	11.85	4.96	7	18.23	6.72
1800. - 2000.	9.48	2.27	7	12.47	6.35
2000. - 2200.	8.60	4.70	7	14.04	2.39
2200. - 2400.	1.48	1.90	7	4.18	.00
2400. - 2600.	.01	.03	7	.07	.00
2600. - 2800.	.00	.00	7	.00	.00
2800. - 3000.	.00	.00	7	.00	.00
3000. - 3200.	.00	.00	7	.00	.00
3200. - 3400.	.00	.00	7	.00	.00
3400. - 3600.	.00	.00	7	.00	.00
3600. - 3800.	.00	.00	7	.00	.00
3800. - 4000.	.00	.00	7	.00	.00
4000. - 4200.	.00	.00	7	.00	.00
4200. - 4400.	.00	.00	7	.00	.00
4400. - 4600.	.00	.00	7	.00	.00
4600. - 4800.	.00	.00	7	.00	.00
4800. - 5000.	.00	.00	7	.00	.00

TABLE D-9.

1966 CHEV. TRACTOR WITH 366 CID V8,34000LB. GCW, TEST WT. 22700 LB.
Truck G-9
VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	1.05	3.03	9	9.13	.00
200. - 400.	.05	.07	9	.21	.00
400. - 600.	12.26	6.08	9	20.35	2.92
600. - 800.	7.48	4.72	9	15.14	3.34
800. - 1000.	3.94	1.03	9	5.24	2.39
1000. - 1200.	7.73	3.07	9	13.20	4.53
1200. - 1400.	14.63	6.08	9	24.19	6.61
1400. - 1600.	16.01	3.57	9	22.67	11.80
1600. - 1800.	6.64	1.22	9	9.08	5.22
1800. - 2000.	6.50	1.84	9	9.22	3.51
2000. - 2200.	9.23	2.57	9	12.71	6.75
2200. - 2400.	7.61	2.59	9	10.86	3.40
2400. - 2600.	2.73	1.70	9	6.11	.76
2600. - 2800.	1.96	1.60	9	5.31	.12
2800. - 3000.	1.45	1.22	9	3.59	.03
3000. - 3200.	.59	.65	9	1.99	.00
3200. - 3400.	.13	.16	9	.40	.00
3400. - 3600.	.02	.04	9	.13	.00
3600. - 3800.	.00	.00	9	.00	.00
3800. - 4000.	.00	.00	9	.00	.00
4000. - 4200.	.00	.00	9	.00	.00
4200. - 4400.	.00	.00	9	.00	.00
4400. - 4600.	.00	.00	9	.00	.00
4600. - 4800.	.00	.00	9	.00	.00
4800. - 5000.	.00	.00	9	.00	.00

TABLE D-10.

1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB.

Truck G-10

VARIABLE: Engine Speed

INTERVAL (RPM) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 200.	.00	.00	8	.00	.00
200. - 400.	.17	.14	8	.32	.00
400. - 600.	11.29	7.32	8	24.36	.71
600. - 800.	6.31	2.12	8	9.73	2.31
800. - 1000.	6.98	2.02	8	10.07	4.04
1000. - 1200.	16.46	6.50	8	24.46	6.39
1200. - 1400.	16.53	3.91	8	23.13	11.79
1400. - 1600.	14.63	4.25	8	21.80	10.14
1600. - 1800.	13.47	1.84	8	15.49	10.38
1800. - 2000.	8.87	2.67	8	12.28	5.83
2000. - 2200.	3.69	2.91	8	9.38	1.20
2200. - 2400.	1.24	1.22	8	3.28	.07
2400. - 2600.	.34	.32	8	.82	.00
2600. - 2800.	.02	.04	8	.11	.00
2800. - 3000.	.00	.00	8	.00	.00
3000. - 3200.	.00	.00	8	.00	.00
3200. - 3400.	.00	.00	8	.01	.00
3400. - 3600.	.00	.00	8	.00	.00
3600. - 3800.	.00	.00	8	.00	.00
3800. - 4000.	.00	.00	8	.00	.00
4000. - 4200.	.00	.00	8	.00	.00
4200. - 4400.	.00	.00	8	.00	.00
4400. - 4600.	.00	.00	8	.00	.00
4600. - 4800.	.00	.00	8	.00	.00
4800. - 5000.	.00	.00	8	.00	.00

VEHICLE SPEED, MPH
AS A FUNCTION OF TIME

TABLE D-11.

1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB.
Truck G-1
VARIABLE : Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	16.68	2.20	8	20.26	13.24
2. -	4.	1.52	.34	8	2.04	.90
4. -	6.	1.40	.25	8	1.74	.95
6. -	8.	1.68	.20	8	2.06	1.35
8. -	10.	2.30	.45	8	3.22	1.91
10. -	12.	3.06	.91	8	4.32	2.01
12. -	1 .	3.47	1.10	8	5.42	1.92
14. -	16.	3.94	.96	8	5.73	3.04
16. -	18.	4.63	1.16	8	7.36	3.50
18. -	20.	4.55	.94	8	6.01	2.99
20. -	22.	4.77	.51	8	5.33	4.00
22. -	24.	4.78	1.09	8	6.12	3.37
24. -	26.	4.99	.93	8	6.52	3.75
26. -	28.	5.34	.50	8	6.19	4.68
28. -	30.	6.52	1.72	8	9.46	4.49
30. -	32.	6.67	1.15	8	8.34	4.88
32. -	34.	5.75	.53	8	6.36	4.96
34. -	36.	3.82	.43	8	5.27	2.72
36. -	38.	2.48	1.17	8	5.16	1.35
38. -	40.	.95	.72	8	2.17	.36
40. -	42.	.65	.57	8	1.77	.18
42. -	44.	.78	.59	8	1.69	.20
44. -	46.	1.38	.95	8	2.96	.23
46. -	48.	1.62	.86	8	2.90	.46
48. -	50.	1.77	1.04	8	3.55	.58
50. -	52.	1.24	.39	8	1.74	.67
52. -	54.	1.36	.82	8	2.74	.27
54. -	56.	1.12	.99	8	2.77	.07
56. -	58.	.50	.61	8	1.40	.01
58. -	60.	.18	.24	8	.78	.00

TABLE D-12.

1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB.
Truck G-2
VARIABLE Vehicle Speed

INTERVAL (MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 2.	17.81	3.51	6	21.36	13.55
2. - 4.	1.97	.76	6	3.30	1.22
4. - 6.	2.24	.83	6	3.40	1.25
6. - 8.	2.24	.87	6	3.83	1.50
8. - 10.	2.29	.52	6	2.83	1.59
10. - 12.	3.16	.64	6	4.01	2.29
12. - 14.	4.20	.74	6	5.29	3.31
14. - 16.	4.91	1.38	6	6.81	2.70
16. - 18.	5.32	1.15	6	7.16	4.26
18. - 20.	5.39	1.63	6	7.59	3.97
20. - 22.	5.20	1.63	6	7.80	3.51
22. - 24.	5.32	1.28	6	7.71	4.10
24. - 26.	6.04	.89	6	6.90	4.37
26. - 28.	6.82	1.79	6	8.52	3.42
28. - 30.	6.62	2.10	6	9.79	3.76
30. - 32.	4.49	.60	6	5.40	3.80
32. - 34.	3.09	2.10	6	5.31	.28
34. - 36.	2.18	2.18	6	6.00	.00
36. - 38.	.95	.92	6	2.78	.28
38. - 40.	.88	.75	6	1.92	.21
40. - 42.	.83	.39	6	1.32	.16
42. - 44.	.89	.43	6	1.29	.18
44. - 46.	1.28	.71	6	2.13	.29
46. - 48.	1.67	.86	6	2.84	.41
48. - 50.	1.69	.81	6	2.40	.36
50. - 52.	1.10	.84	6	2.00	.00
52. - 54.	.69	.73	6	1.92	.00
54. - 56.	.36	.62	6	1.57	.00
56. - 58.	.23	.52	6	1.28	.00
58. - 60.	.11	.27	6	.65	.00

TABLE D-13.

1967 FORD BOX VAN WITH 300 CID I6. 10000LB. GVW.TEST WT.9140 LB.

Truck G-3

VARIABLE: Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	16.54	3.96	8	21.85	9.68
2. -	4.	2.31	.96	8	3.82	1.12
4. -	6.	2.17	.77	8	3.44	1.30
6. -	8.	2.46	.87	8	3.93	1.12
8. -	10.	2.82	.70	8	4.06	1.86
10. -	12.	3.83	1.09	8	5.57	2.02
12. -	14.	3.96	1.06	8	5.77	2.03
14. -	16.	3.86	1.62	8	6.89	1.86
16. -	18.	3.88	1.10	8	5.40	2.48
18. -	20.	3.72	.90	8	5.59	2.38
20. -	22.	4.45	1.54	8	7.74	2.99
22. -	24.	4.60	1.07	8	6.33	3.20
24. -	26.	5.12	1.46	8	7.26	3.12
26. -	28.	5.88	1.61	8	9.31	4.49
28. -	30.	5.79	.86	8	7.02	4.44
30. -	32.	6.01	1.25	8	7.41	4.10
32. -	34.	5.65	2.02	8	9.37	3.81
34. -	36.	3.42	1.46	8	5.90	1.68
36. -	38.	1.80	.62	8	2.63	.66
38. -	40.	1.07	.63	8	2.17	.51
40. -	42.	.82	.70	8	2.01	.25
42. -	44.	.78	.81	8	2.59	.17
44. -	46.	1.36	1.33	8	3.54	.23
46. -	48.	1.67	1.05	8	3.14	.33
48. -	50.	1.80	1.03	8	3.61	.43
50. -	52.	1.90	1.64	8	5.03	.25
52. -	54.	1.30	1.08	8	3.01	.03
54. -	56.	.70	1.01	8	2.31	.00
56. -	58.	.22	.39	8	1.08	.00
58. -	60.	.11	.29	8	.82	.00

TABLE D-14.

1969 CHEV BOX VAN WITH 350 CID V8 18000LB. GVW TEST WT. 13475 LB.
Truck G-4
VARIABLE: Vehicle Speed

INTERVAL (MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 2.	14.84	2.71	9	18.54	11.42
2. - 4.	1.77	.50	9	2.76	1.20
4. - 6.	1.89	.71	9	3.00	1.10
6. - 8.	2.51	.49	9	3.41	1.98
8. - 10.	2.69	.70	9	4.03	1.90
10. - 12.	3.08	.50	9	3.79	2.03
12. - 14.	3.93	1.29	9	6.59	2.55
14. - 16.	4.98	1.33	9	6.39	2.77
16. - 18.	4.65	.87	9	6.00	2.96
18. - 20.	4.63	1.22	9	6.56	2.81
20. - 22.	4.35	.99	9	6.00	3.11
22. - 24.	5.17	1.21	9	7.20	3.42
24. - 26.	5.34	1.80	9	8.97	3.48
26. - 28.	6.31	2.21	9	9.76	3.30
28. - 30.	6.38	2.84	9	12.09	3.48
30. - 32.	6.13	.94	9	7.18	4.76
32. - 34.	5.20	1.78	9	8.79	2.52
34. - 36.	3.04	1.63	9	5.52	1.26
36. - 38.	1.55	1.36	9	4.58	.32
38. - 40.	1.00	.80	9	2.75	.32
40. - 42.	.80	.71	9	2.20	.16
42. - 44.	1.39	1.08	9	3.30	.27
44. - 46.	2.45	1.65	9	5.12	.77
46. - 48.	2.31	.91	9	3.70	.69
48. - 50.	1.68	1.07	9	3.10	.25
50. - 52.	1.12	1.01	9	2.52	.00
52. - 54.	.61	.70	9	1.89	.00
54. - 56.	.17	.26	9	.75	.00
56. - 58.	.02	.04	9	.12	.00
58. - 60.	.00	.00	9	.01	.00

TABLE D-15.

1967 DODGE STAKE TK W/318 CID V8. 19500LB. GVW. TEST WT. 13875 LB.
Truck G-5
VARIABLE : Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	14.44	5.95	6	22.82	8.60
2. -	4.	1.99	.42	6	2.63	1.43
4. -	6.	2.00	.27	6	2.49	1.75
6. -	8.	2.37	.49	6	2.75	1.40
8. -	10.	2.31	.56	6	2.82	1.61
10. -	12.	2.91	.73	6	3.68	1.76
12. -	14.	3.40	.63	6	4.12	2.48
14. -	16.	3.78	.59	6	4.56	3.16
16. -	18.	4.54	.77	6	5.70	3.39
18. -	20.	6.11	1.30	6	7.89	4.56
20. -	22.	5.26	1.67	6	8.07	3.40
22. -	24.	5.11	.81	6	6.25	4.25
24. -	26.	6.35	1.62	6	8.96	4.41
26. -	28.	6.42	.90	6	7.37	5.19
28. -	30.	7.28	1.14	6	8.91	5.36
30. -	32.	7.19	1.10	6	8.95	5.98
32. -	34.	4.71	1.74	6	6.22	1.93
34. -	36.	2.35	1.67	6	4.60	.53
36. -	38.	1.30	1.04	6	3.04	.18
38. -	40.	1.14	1.12	6	3.02	.25
40. -	42.	1.23	1.00	6	2.63	.18
42. -	44.	2.07	1.41	6	3.79	.54
44. -	46.	2.37	1.39	6	4.30	.53
46. -	48.	1.35	.92	6	2.23	.00
48. -	50.	1.17	1.12	6	3.14	.00
50. -	52.	.54	.81	6	2.12	.00
52. -	54.	.29	.69	6	1.69	.00
54. -	56.	.02	.04	6	.09	.00
56. -	58.	.00	.00	6	.00	.00
58. -	60.	.00	.00	6	.00	.00

TABLE D-16.

1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB
Truck G-6
VARIABLE: Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	15.87	2.73	9	20.23	12.80
2. -	4.	2.34	.55	9	3.06	1.43
4. -	6.	2.48	.70	9	3.43	1.59
6. -	8.	2.99	.67	9	3.75	1.52
8. -	10.	3.55	.75	9	4.62	2.50
10. -	12.	3.05	.58	9	3.76	2.43
12. -	14.	3.28	.65	9	4.44	2.49
14. -	16.	4.65	1.07	9	6.01	3.05
16. -	18.	6.02	1.32	9	8.78	4.34
18. -	20.	5.84	1.00	9	7.10	4.55
20. -	22.	5.67	1.10	9	7.75	4.26
22. -	24.	6.18	1.40	9	8.23	4.36
24. -	26.	6.67	.87	9	8.30	5.57
26. -	28.	6.97	1.06	9	8.66	5.61
28. -	30.	6.26	1.45	9	8.20	3.55
30. -	32.	4.27	1.23	9	6.34	2.18
32. -	34.	2.53	1.23	9	4.50	.84
34. -	36.	1.10	.54	9	1.98	.25
36. -	38.	.44	.22	9	.80	.21
38. -	40.	.51	.79	9	2.55	.15
40. -	42.	1.09	1.45	9	4.30	.14
42. -	44.	1.44	.72	9	2.67	.69
44. -	46.	2.12	.98	9	3.53	.48
46. -	48.	2.10	1.15	9	3.72	.01
48. -	50.	1.53	.98	9	2.92	.00
50. -	52.	.87	.86	9	2.16	.00
52. -	54.	.15	.25	9	.77	.00
54. -	56.	.02	.05	9	.14	.00
56. -	58.	.00	.01	9	.03	.00
58. -	60.	.00	.00	9	.01	.00

TABLE D-17.

1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850
Truck G-7
VARIABLE: Vehicle Speed

INTERVAL (MPH)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	11.83	4.35	8	18.67	5.16
2. -	4.	1.68	.49	8	2.41	.98
4. -	6.	2.03	.70	8	3.44	1.35
6. -	8.	1.88	.34	8	2.44	1.37
8. -	10.	1.84	.50	8	2.66	1.37
10. -	12.	2.04	.62	8	2.84	1.19
12. -	14.	2.81	.82	8	4.07	1.82
14. -	16.	3.45	.52	8	4.38	2.61
16. -	18.	3.96	.98	8	5.87	2.59
18. -	20.	4.65	.33	8	5.09	4.14
20. -	22.	5.12	.82	8	6.68	4.34
22. -	24.	5.47	1.14	8	7.50	4.05
24. -	26.	5.56	1.64	8	7.96	3.64
26. -	28.	6.10	1.09	8	7.50	4.57
28. -	30.	6.55	1.81	8	9.75	4.30
30. -	32.	6.70	2.34	8	10.56	3.12
32. -	34.	6.27	2.11	8	8.86	3.47
34. -	36.	4.62	.97	8	5.31	2.73
36. -	38.	3.65	2.02	8	8.01	1.35
38. -	40.	1.90	1.54	8	4.91	.67
40. -	42.	.81	.54	8	1.80	.26
42. -	44.	.75	.58	8	1.84	.24
44. -	46.	.78	.65	8	1.86	.16
46. -	48.	1.29	.98	8	3.06	.17
48. -	50.	2.67	1.31	8	4.14	.46
50. -	52.	2.79	1.46	8	4.30	.66
52. -	54.	1.27	1.32	8	4.18	.13
54. -	56.	.74	1.08	8	2.75	.00
56. -	58.	.60	1.17	8	3.38	.00
58. -	60.	.16	.44	8	1.24	.00

TABLE D-18.

1965 GMC BOX VAN WITH 351 CID V6. 19500 LB GVW. TEST WT. 16000 LB.
Truck G-8
VARIABLE: Vehicle Speed

INTERVAL (MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. - 2.	12.77	2.56	7	14.84	8.54
2. - 4.	2.00	.22	7	2.23	1.70
4. - 6.	2.23	.36	7	2.89	1.83
6. - 8.	2.64	.46	7	3.26	2.07
8. - 10.	3.47	.96	7	4.91	2.51
10. - 12.	4.07	.78	7	5.39	3.32
12. - 14.	4.63	.71	7	5.56	3.61
14. - 16.	4.79	.98	7	6.20	3.55
16. - 18.	5.85	1.49	7	7.19	2.74
18. - 20.	6.68	1.16	7	8.37	4.76
20. - 22.	7.72	1.85	7	9.80	4.18
22. - 24.	9.83	1.61	7	12.99	8.29
24. - 26.	8.82	1.82	7	11.11	5.56
26. - 28.	7.55	1.82	7	9.88	5.12
28. - 30.	4.21	2.21	7	7.10	1.49
30. - 32.	1.12	.37	7	1.64	.53
32. - 34.	.34	.18	7	.54	.00
34. - 36.	.70	.60	7	2.01	.29
36. - 38.	1.42	.95	7	2.93	.29
38. - 40.	2.63	1.12	7	3.87	.45
40. - 42.	2.82	1.92	7	6.35	.46
42. - 44.	1.84	.78	7	3.24	.87
44. - 46.	.94	.76	7	2.06	.00
46. - 48.	.50	.74	7	2.07	.00
48. - 50.	.29	.64	7	1.74	.00
50. - 52.	.10	.27	7	.71	.00
52. - 54.	.02	.05	7	.14	.00
54. - 56.	.00	.00	7	.00	.00
56. - 58.	.00	.00	7	.00	.00
58. - 60.	.00	.00	7	.00	.00

TABLE D-19.

1966 CHEV. TRACTOR WITH 366 CID V8,34000LB. GCW, TEST WT. 22700 LB.
Truck G-9
VARIABLE: Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	15.48	5.45	9	23.87	8.29
2. -	4.	2.81	.65	9	3.59	1.56
4. -	6.	2.90	.53	9	3.50	2.00
6. -	8.	3.41	.69	9	4.30	2.18
8. -	10.	4.33	.91	9	5.38	2.71
10. -	12.	4.41	.97	9	5.82	2.92
12. -	14.	6.04	.78	9	7.53	5.16
14. -	16.	6.09	.97	9	7.57	4.28
16. -	18.	5.74	.81	9	7.20	4.41
18. -	20.	6.27	1.59	9	8.75	3.99
20. -	22.	7.29	1.66	9	9.91	5.34
22. -	24.	8.09	2.03	9	10.60	5.44
24. -	26.	8.78	2.14	9	11.52	5.52
26. -	28.	5.68	2.25	9	9.96	2.49
28. -	30.	1.76	.49	9	2.66	1.06
30. -	32.	1.27	.77	9	2.61	.47
32. -	34.	1.24	.86	9	3.23	.53
34. -	36.	1.49	.55	9	2.46	.73
36. -	38.	1.99	.61	9	2.92	1.04
38. -	40.	2.27	1.03	9	3.46	.00
40. -	42.	1.61	.88	9	2.73	.00
42. -	44.	.77	.55	9	1.54	.00
44. -	46.	.19	.19	9	.44	.00
46. -	48.	.04	.05	9	.15	.00
48. -	50.	.01	.02	9	.06	.00
50. -	52.	.02	.04	9	.13	.00
52. -	54.	.00	.00	9	.01	.00
54. -	56.	.00	.00	9	.00	.00
56. -	58.	.00	.00	9	.00	.00
58. -	60.	.00	.00	9	.00	.00

TABLE D-20.

1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB.
Truck G-10
VARIABLE: Vehicle Speed

INTERVAL	(MPH) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
. -	2.	13.86	4.93	8	23.67	7.47
2. -	4.	3.83	.69	8	5.11	3.06
4. -	6.	3.75	1.33	8	5.50	1.81
6. -	8.	3.54	.85	8	4.67	2.13
8. -	10.	3.03	.78	8	4.23	1.70
10. -	12.	3.32	.43	8	3.89	2.55
12. -	14.	4.58	.54	8	5.33	4.01
14. -	16.	4.98	.93	8	6.54	3.84
16. -	18.	5.48	.98	8	6.72	3.98
18. -	20.	5.56	.41	8	6.14	5.04
20. -	22.	6.59	1.00	8	8.44	5.57
22. -	24.	8.02	1.56	8	11.39	6.08
24. -	26.	7.63	1.36	8	10.31	5.34
26. -	28.	6.94	1.32	8	9.52	5.64
28. -	30.	4.96	1.80	8	7.50	2.43
30. -	32.	2.29	.96	8	3.72	.79
32. -	34.	1.21	.59	8	2.39	.59
34. -	36.	.76	.23	8	1.12	.38
36. -	38.	.80	.28	8	1.14	.43
38. -	40.	1.31	.70	8	2.31	.34
40. -	42.	1.93	.89	8	2.97	.57
42. -	44.	2.04	.57	8	2.67	1.00
44. -	46.	1.57	.34	8	2.14	1.09
46. -	48.	1.03	.68	8	2.23	.37
48. -	50.	.66	.78	8	2.32	.02
50. -	52.	.28	.38	8	1.14	.00
52. -	54.	.07	.13	8	.38	.00
54. -	56.	.00	.00	8	.00	.00
56. -	58.	.00	.00	8	.00	.00
58. -	60.	.00	.00	8	.00	.00

TABLE D-21.

1967 FORD BOX VAN WITH 330 CID V8. 17000 LB GVW. TEST WT. 12400 LB.
Truck G-1
VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. - 1.	7.44	1.45	8	9.96	4.84
1. - 2.	3.79	.97	8	5.45	2.60
2. - 3.	3.16	.97	8	4.53	1.70
3. - 4.	2.99	.79	8	4.18	1.90
4. - 5.	2.49	.68	8	4.10	2.01
5. - 6.	2.57	.38	8	3.08	2.14
6. - 7.	2.65	.23	8	2.95	2.26
7. - 8.	2.66	.32	8	3.06	2.26
8. - 9.	2.68	.60	8	3.48	1.71
9. - 10.	2.70	.44	8	3.39	2.26
10. - 11.	2.65	.31	8	3.15	2.28
11. - 12.	2.71	.46	8	3.61	2.34
12. - 13.	2.51	.57	8	3.66	1.92
13. - 14.	2.41	.40	8	2.89	1.75
14. - 15.	2.25	.40	8	3.01	1.76
15. - 16.	2.45	.51	8	3.17	1.63
16. - 17.	2.44	.38	8	2.84	1.85
17. - 18.	2.42	.75	8	3.33	1.54
18. - 19.	2.85	.80	8	4.19	1.95
19. - 20.	8.50	3.36	8	14.33	3.23
20. - 21.	13.96	2.01	8	15.94	10.58
21. - 22.	4.09	1.14	8	5.91	2.90
22. - 23.	3.28	.75	8	4.35	2.32
23. - 24.	5.03	.77	8	6.15	4.01
24. - 25.	9.32	1.75	8	11.97	6.44
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00

TABLE D-22.

1968 IHC BOX VAN WITH 304 CID V8. 18200 LB. GVW. TEST WT. 14385 LB.
Truck G-2
VARIABLE : Intake Manifold Vacuum

INTERVAL	(In. Hg.) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	11.59	2.18	6	14.88	9.22
1. -	2.	7.21	1.16	6	9.31	5.82
2. -	3.	4.03	.86	6	5.44	2.84
3. -	4.	3.37	.47	6	4.16	2.92
4. -	5.	2.90	.72	6	3.72	1.98
5. -	6.	2.39	.32	6	2.94	2.08
6. -	7.	2.36	.66	6	3.26	1.33
7. -	8.	1.95	.33	6	2.56	1.70
8. -	9.	2.22	.65	6	3.40	1.59
9. -	10.	2.03	.63	6	2.98	1.37
10. -	11.	1.69	.30	6	2.08	1.30
11. -	12.	1.73	.47	6	2.30	1.13
12. -	13.	1.97	.61	6	2.75	1.22
13. -	14.	2.33	.66	6	3.90	1.36
14. -	15.	2.17	.77	6	3.46	1.13
15. -	16.	2.26	.71	6	3.12	1.42
16. -	17.	5.69	2.95	6	10.09	2.27
17. -	18.	13.86	5.09	6	17.53	3.69
18. -	19.	6.15	4.77	6	15.74	3.27
19. -	20.	4.98	3.55	6	12.06	2.46
20. -	21.	5.67	1.74	6	7.39	2.84
21. -	22.	8.70	3.03	6	11.01	2.84
22. -	23.	1.44	1.82	6	5.11	.36
23. -	24.	1.18	2.89	6	7.09	.00
24. -	25.	.12	.29	6	.71	.00
. -	.	.00	.00	6	.01	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00

TABLE D-23.

1967 FORD BOX VAN WITH 300 CID I6, 10000LB. GVW.TEST WT.9140 LB.
Truck G-3
VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	.00	.00	8	.01	.00
1. -	2.	.68	.58	8	1.42	.00
2. -	3.	1.95	1.51	8	4.07	.00
3. -	4.	3.84	.77	8	5.02	2.42
4. -	5.	3.93	1.04	8	5.40	2.63
5. -	6.	2.94	.80	8	4.65	2.12
6. -	7.	2.94	.59	8	4.09	2.03
7. -	8.	3.12	.53	8	3.72	2.23
8. -	9.	3.27	.65	8	4.38	2.61
9. -	10.	3.18	1.03	8	5.59	2.53
10. -	11.	3.16	.69	8	3.98	2.21
11. -	12.	3.06	.58	8	4.10	2.38
12. -	13.	2.74	.70	8	4.00	1.49
13. -	14.	2.82	.76	8	4.36	2.05
14. -	15.	7.88	2.76	8	12.35	4.04
15. -	16.	11.78	6.21	8	17.87	2.19
16. -	17.	8.66	4.45	8	18.35	5.64
17. -	18.	4.50	1.01	8	6.06	2.98
18. -	19.	3.91	.78	8	5.63	3.20
19. -	20.	3.69	.71	8	5.03	2.83
20. -	21.	3.96	.79	8	5.02	2.81
21. -	22.	4.75	1.58	8	6.40	1.68
22. -	23.	4.40	1.26	8	7.04	2.69
23. -	24.	4.28	1.42	8	7.26	2.87
24. -	25.	2.48	1.49	8	5.03	.84
25. -	26.	1.08	1.84	8	4.21	.00
26. -	27.	.76	1.51	8	4.04	.00
27. -	28.	.26	.55	8	1.52	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00

TABLE D-24.

1969 CHEV BOX VAN WITH 350 CID V8 18000LB. GVW TEST WT. 13475 LB.
Truck G-4
VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	2.21	1.85	9	5.28	.15
1. -	2.	3.71	1.51	9	5.85	1.58
2. -	3.	4.43	1.45	9	6.87	1.42
3. -	4.	3.57	1.33	9	5.61	2.28
4. -	5.	2.73	.70	9	3.96	1.96
5. -	6.	2.24	.32	9	2.90	1.79
6. -	7.	2.38	.17	9	2.62	2.18
7. -	8.	1.96	.47	9	2.45	.92
8. -	9.	2.16	.36	9	2.69	1.47
9. -	10.	2.67	.42	9	3.36	2.20
10. -	11.	2.90	.86	9	4.50	1.58
11. -	12.	3.29	.84	9	5.03	1.90
12. -	13.	3.59	.81	9	5.15	2.66
13. -	14.	3.29	1.07	9	4.90	1.76
14. -	15.	3.23	.80	9	4.47	2.07
15. -	16.	4.31	2.48	9	9.25	2.18
16. -	17.	6.00	3.25	9	10.56	2.59
17. -	18.	7.15	3.69	9	12.83	3.11
18. -	19.	7.10	4.06	9	14.84	2.56
19. -	20.	4.38	1.86	9	8.06	1.56
20. -	21.	3.34	.79	9	5.08	2.48
21. -	22.	4.25	1.48	9	6.47	2.51
22. -	23.	5.12	2.53	9	8.64	1.83
23. -	24.	4.99	2.65	9	9.39	2.10
24. -	25.	5.52	4.09	9	11.01	.00
25. -	26.	2.24	2.71	9	8.42	.00
26. -	27.	.84	1.60	9	4.76	.00
27. -	28.	.39	.80	9	2.21	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00

TABLE D-25.

1967 DODGE STAKE TK W/318 CID V8. 19500LB. GVW. TEST WT. 13875 LB.

Truck G-5

VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.) <		MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	8.96	4.11	6	14.87	2.12
1. -	2.	14.87	5.66	6	24.11	7.89
2. -	3.	5.29	1.70	6	7.66	3.86
3. -	4.	2.52	.40	6	3.19	2.11
4. -	5.	2.12	.38	6	2.51	1.47
5. -	6.	1.69	.61	6	2.87	1.23
6. -	7.	1.88	.74	6	3.16	1.21
7. -	8.	1.74	.60	6	2.95	1.40
8. -	9.	1.90	.68	6	2.81	1.16
9. -	10.	1.85	1.27	6	4.39	.94
10. -	11.	1.56	.36	6	2.06	1.06
11. -	12.	1.66	.50	6	2.35	1.05
12. -	13.	1.54	.51	6	2.41	1.03
13. -	14.	1.89	.66	6	2.48	.90
14. -	15.	2.19	.64	6	3.16	1.25
15. -	16.	4.37	2.83	6	7.76	.90
16. -	17.	9.00	6.28	6	15.30	1.25
17. -	18.	2.92	.61	6	3.51	1.93
18. -	19.	4.94	3.64	6	10.39	2.43
19. -	20.	3.67	1.41	6	5.79	2.33
20. -	21.	2.69	.83	6	4.08	1.75
21. -	22.	3.00	.96	6	4.28	1.93
22. -	23.	5.30	2.74	6	7.71	1.75
23. -	24.	4.87	2.35	6	7.68	1.75
24. -	25.	1.59	1.84	6	4.91	.00
25. -	26.	3.14	4.87	6	10.04	.00
26. -	27.	2.43	3.76	6	7.53	.00
27. -	28.	.21	.42	6	1.05	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00
. -	.	.00	.00	6	.00	.00

TABLE D-26.

1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB
Truck G-6
VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	12.21	13.64	9	35.27	.22
1. -	2.	16.41	9.59	9	28.54	4.11
2. -	3.	5.59	3.02	9	9.88	1.86
3. -	4.	2.97	1.50	9	5.10	1.53
4. -	5.	1.95	.49	9	2.72	1.41
5. -	6.	1.85	.58	9	3.01	1.18
6. -	7.	1.77	.46	9	2.82	1.26
7. -	8.	1.66	.35	9	2.21	1.25
8. -	9.	1.43	.20	9	1.72	1.12
9. -	10.	1.54	.28	9	2.00	1.18
10. -	11.	1.41	.46	9	2.23	.99
11. -	12.	1.25	.27	9	1.70	.86
12. -	13.	1.21	.27	9	1.75	.87
13. -	14.	1.19	.32	9	1.72	.79
14. -	15.	1.19	.26	9	1.54	.81
15. -	16.	1.24	.41	9	1.98	.81
16. -	17.	1.66	.83	9	3.34	1.01
17. -	18.	6.00	4.57	9	12.07	1.37
18. -	19.	7.70	2.98	9	12.20	4.77
19. -	20.	4.36	2.33	9	7.75	1.42
20. -	21.	2.00	.85	9	4.09	1.13
21. -	22.	1.90	.66	9	3.25	1.03
22. -	23.	2.92	1.22	9	4.41	1.41
23. -	24.	7.73	4.70	9	13.99	3.26
24. -	25.	7.96	4.69	9	13.80	2.55
25. -	26.	2.22	2.61	9	6.01	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00
. -	.	.00	.00	9	.00	.00

TABLE D-27.

1965 CHEVROLET BOX VAN WITH 292 CID I-6. 19500 LB GVW. TEST WT 14850
Truck G-7

VARIABLE : Intake Manifold Vacuum

INTERVAL (In. Hg.) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. - 1.	4.94	4.22	8	12.05	.97
1. - 2.	9.58	3.89	8	16.58	4.08
2. - 3.	6.51	1.30	8	9.01	5.27
3. - 4.	4.04	1.68	8	6.98	1.78
4. - 5.	3.31	1.48	8	6.10	1.89
5. - 6.	2.99	1.15	8	4.58	1.68
6. - 7.	2.84	1.38	8	4.77	1.33
7. - 8.	2.43	.86	8	3.63	1.52
8. - 9.	2.43	.74	8	3.49	1.36
9. - 10.	2.76	.75	8	3.69	1.61
10. - 11.	2.86	.81	8	4.12	2.02
11. - 12.	2.73	.83	8	3.95	1.76
12. - 13.	2.74	1.07	8	4.48	1.59
13. - 14.	2.72	.99	8	4.60	1.95
14. - 15.	2.71	.73	8	4.21	2.07
15. - 16.	3.91	1.54	8	5.78	1.81
16. - 17.	5.94	1.76	8	9.36	4.30
17. - 18.	6.24	3.07	8	9.50	2.38
18. - 19.	3.07	1.76	8	5.59	1.01
19. - 20.	1.71	.35	8	2.32	1.04
20. - 21.	1.83	.47	8	2.64	1.39
21. - 22.	2.51	1.02	8	4.26	1.63
22. - 23.	4.66	1.45	8	6.90	2.60
23. - 24.	7.12	.64	8	8.05	6.22
24. - 25.	5.68	2.80	8	10.20	3.07
25. - 26.	1.32	1.82	8	4.65	.03
26. - 27.	.02	.06	8	.16	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.01	8	.02	.00
. - .	.00	.01	8	.02	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00
. - .	.00	.00	8	.00	.00

TABLE D-28.

1965 GMC BOX VAN WITH 351 CID V6. 19500 LB GVW. TEST WT. 16000 LB.
Truck G-8
VARIABLE : Intake Manifold Vacuum

INTERVAL (In. Hg.) <	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. - 1.	2.38	2.53	7	6.51	.00
1. - 2.	6.65	5.19	7	13.42	.00
2. - 3.	7.21	6.80	7	21.45	.00
3. - 4.	6.72	3.03	7	10.38	2.61
4. - 5.	5.98	4.17	7	13.60	2.46
5. - 6.	3.85	1.74	7	6.10	1.54
6. - 7.	4.15	1.73	7	7.54	2.47
7. - 8.	2.65	1.07	7	4.46	1.08
8. - 9.	2.65	.83	7	3.81	1.54
9. - 10.	2.85	.96	7	4.89	2.16
10. - 11.	2.07	.69	7	3.12	1.23
11. - 12.	1.78	.39	7	2.55	1.23
12. - 13.	1.61	.61	7	2.32	.62
13. - 14.	1.97	.64	7	2.91	1.30
14. - 15.	1.67	.61	7	2.81	1.21
15. - 16.	1.20	.62	7	2.09	.43
16. - 17.	1.72	.73	7	2.74	1.08
17. - 18.	2.89	1.83	7	4.89	.58
18. - 19.	3.46	1.90	7	6.36	1.27
19. - 20.	6.39	3.17	7	10.19	1.33
20. - 21.	4.71	3.98	7	13.71	2.94
21. - 22.	3.97	2.21	7	8.54	2.19
22. - 23.	5.89	3.88	7	14.33	2.63
23. - 24.	6.17	1.63	7	8.80	4.16
24. - 25.	4.49	1.45	7	5.84	1.68
25. - 26.	3.05	2.76	7	6.13	.03
26. - 27.	1.31	2.35	7	5.87	.00
27. - 28.	.51	.86	7	1.81	.00
28. - 29.	.01	.04	7	.10	.00
. - .	.00	.00	7	.00	.00
. - .	.00	.00	7	.00	.00
. - .	.00	.00	7	.00	.00
. - .	.00	.00	7	.00	.00

TABLE D-29.

1966 CHEV. TRACTOR WITH 366 CID V8.34000LB. GCW. TEST WT. 22700 LB.
Truck G-9
VARIABLE: Intake Manifold Vacuum

INTERVAL (In. Hg.)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. –	1.	6.11	5.60	9	15.29	.84
1. –	2.	7.70	1.94	9	12.60	6.27
2. –	3.	4.00	1.42	9	6.05	2.33
3. –	4.	3.18	.76	9	4.31	1.95
4. –	5.	2.99	.99	9	4.18	1.23
5. –	6.	2.94	.60	9	4.02	2.00
6. –	7.	2.67	.56	9	3.47	2.00
7. –	8.	2.41	.42	9	2.92	1.54
8. –	9.	2.51	.54	9	3.36	1.78
9. –	10.	2.61	.47	9	3.45	1.95
10. –	11.	2.38	.30	9	2.80	1.93
11. –	12.	2.66	.96	9	4.67	1.73
12. –	13.	2.46	.52	9	3.38	1.77
13. –	14.	2.45	1.04	9	3.98	.33
14. –	15.	2.65	.45	9	3.28	1.87
15. –	16.	3.69	1.34	9	6.79	2.53
16. –	17.	14.29	4.39	9	23.48	7.90
17. –	18.	4.88	1.08	9	6.64	3.14
18. –	19.	2.35	.73	9	4.15	1.61
19. –	20.	2.53	.52	9	3.38	1.67
20. –	21.	2.77	.50	9	3.67	2.08
21. –	22.	4.12	.91	9	5.58	2.85
22. –	23.	7.57	.93	9	8.91	6.23
23. –	24.	6.45	1.92	9	8.56	3.13
24. –	25.	.32	.36	9	1.21	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00
. –	.	.00	.00	9	.00	.00

TABLE D-30.

1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB.
Truck G-10
VARIABLE : Intake Manifold Vacuum

INTERVAL (In. Hg.)	<	MEAN	S. DEV.	SAMPLE	MAX	MIN
0. -	1.	4.19	3.71	8	10.08	.06
1. -	2.	4.76	2.14	8	8.89	2.39
2. -	3.	3.61	1.86	8	5.97	.78
3. -	4.	3.64	2.07	8	6.81	1.25
4. -	5.	2.97	1.02	8	4.32	1.21
5. -	6.	3.37	.79	8	4.91	2.62
6. -	7.	3.46	.77	8	4.53	2.16
7. -	8.	2.98	.64	8	3.94	1.91
8. -	9.	3.34	.89	8	4.53	2.48
9. -	10.	3.14	.94	8	4.66	1.82
10. -	11.	3.24	1.30	8	5.76	1.73
11. -	12.	3.42	1.18	8	5.38	1.80
12. -	13.	2.93	.64	8	3.84	1.86
13. -	14.	3.67	.71	8	4.80	2.76
14. -	15.	3.30	.53	8	3.96	2.71
15. -	16.	3.51	.94	8	5.30	2.31
16.	17.	3.64	1.32	8	5.70	2.01
17. -	18.	11.59	5.09	8	21.38	5.51
18. -	19.	5.75	1.42	8	8.78	4.30
19. -	20.	6.85	4.91	8	18.66	3.57
20. -	21.	4.11	.92	8	5.25	2.54
21. -	22.	6.64	2.99	8	10.33	.25
22. -	23.	5.74	2.44	8	7.77	.00
23. -	24.	.16	.22	8	.62	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00
. -	.	.00	.00	8	.00	.00

APPENDIX E. ROAD ROUTE VEHICLE SPEED, ENGINE SPEED, AND MANIFOLD VACUUM HISTOGRAMS FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS

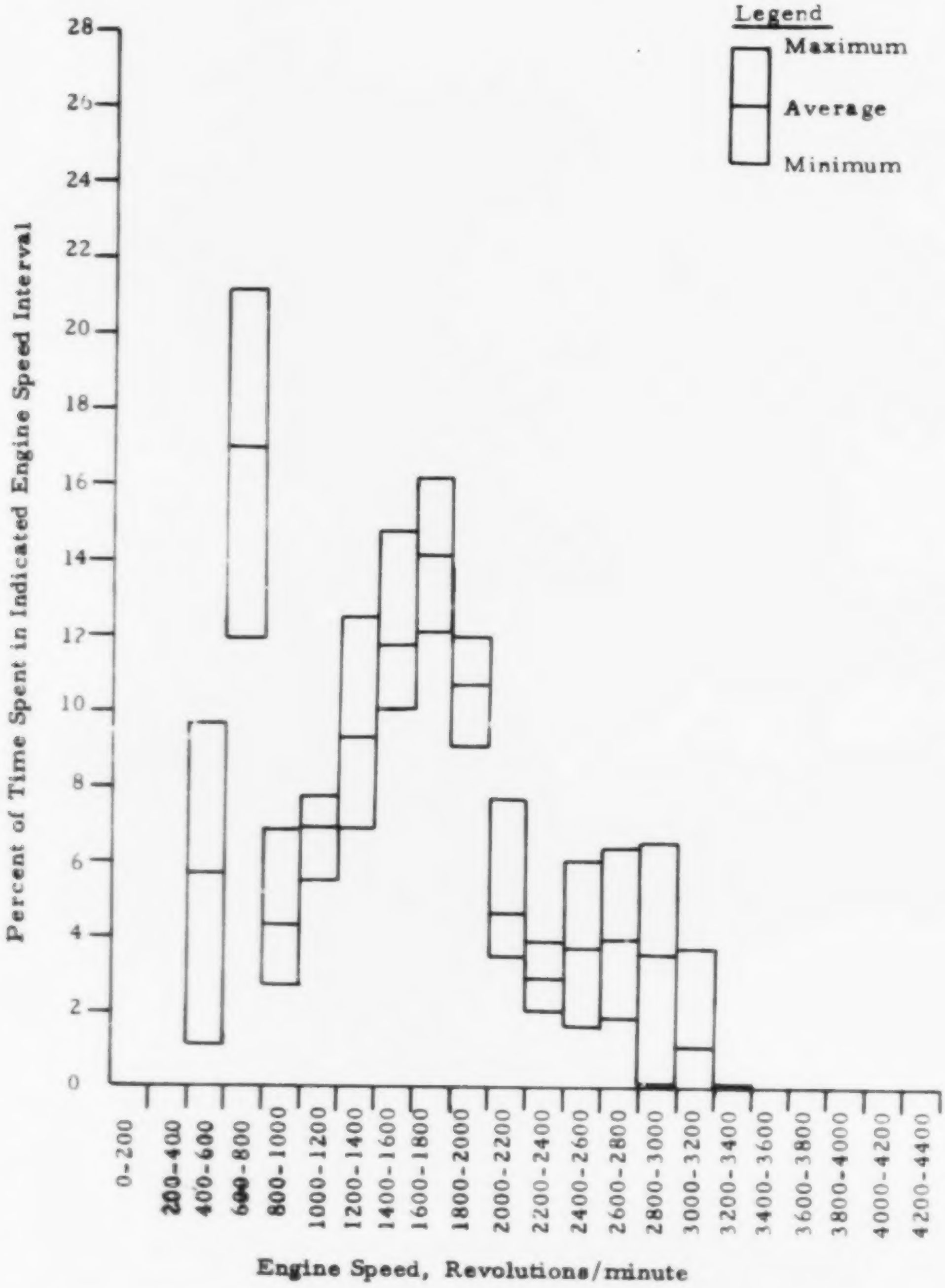

FIGURE E-1. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-1

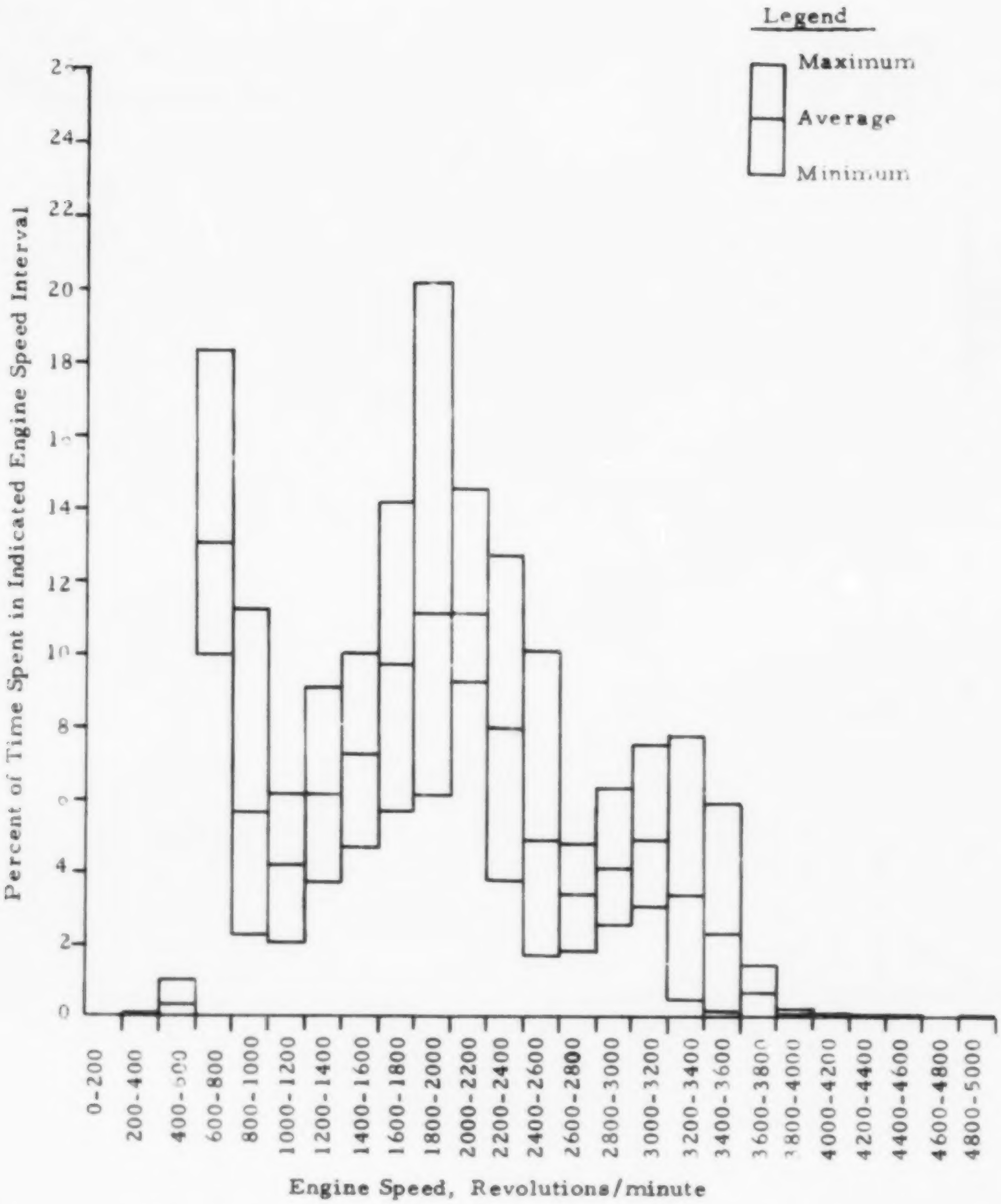

FIGURE E-4. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-4

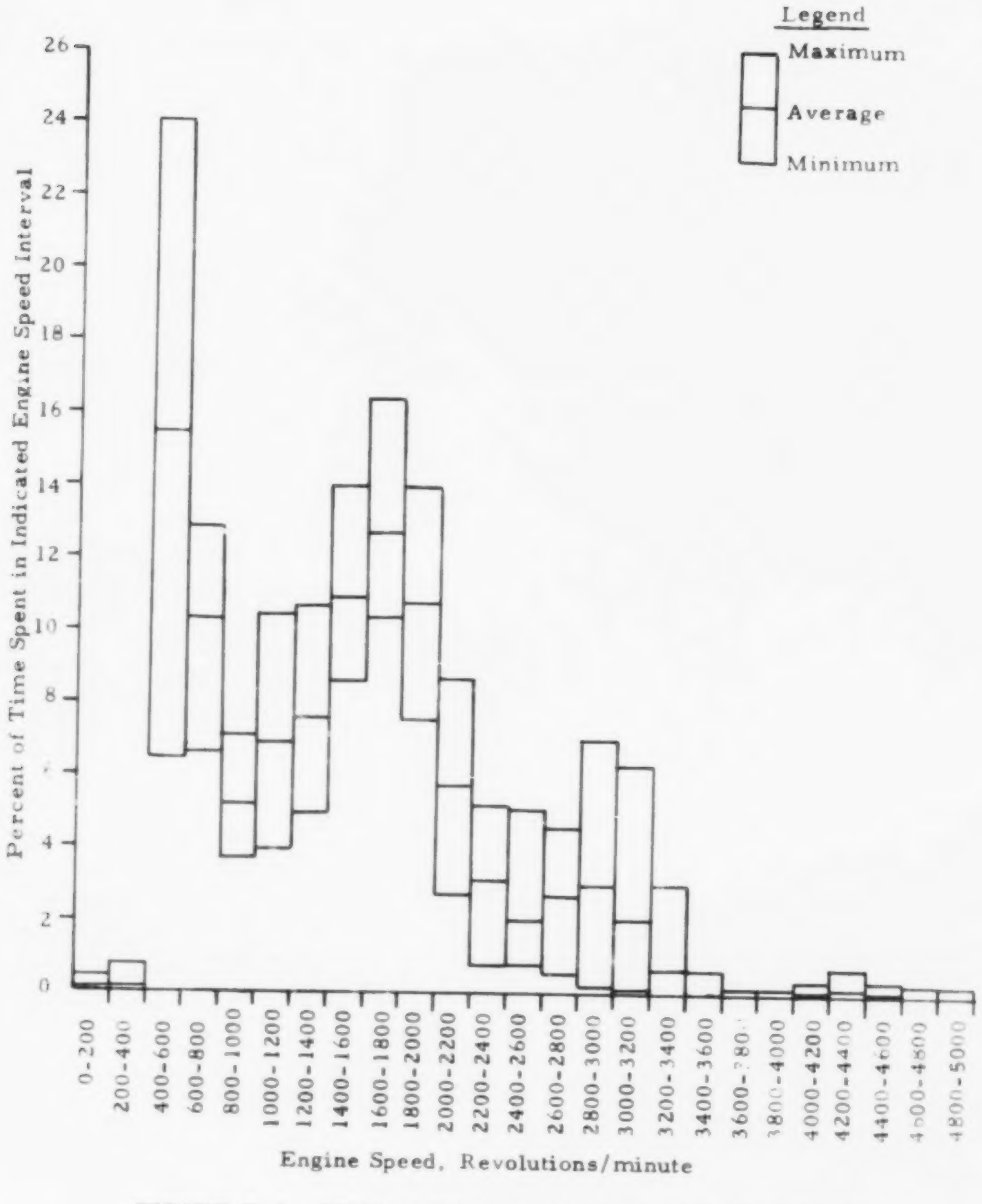

FIGURE E-3. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-3

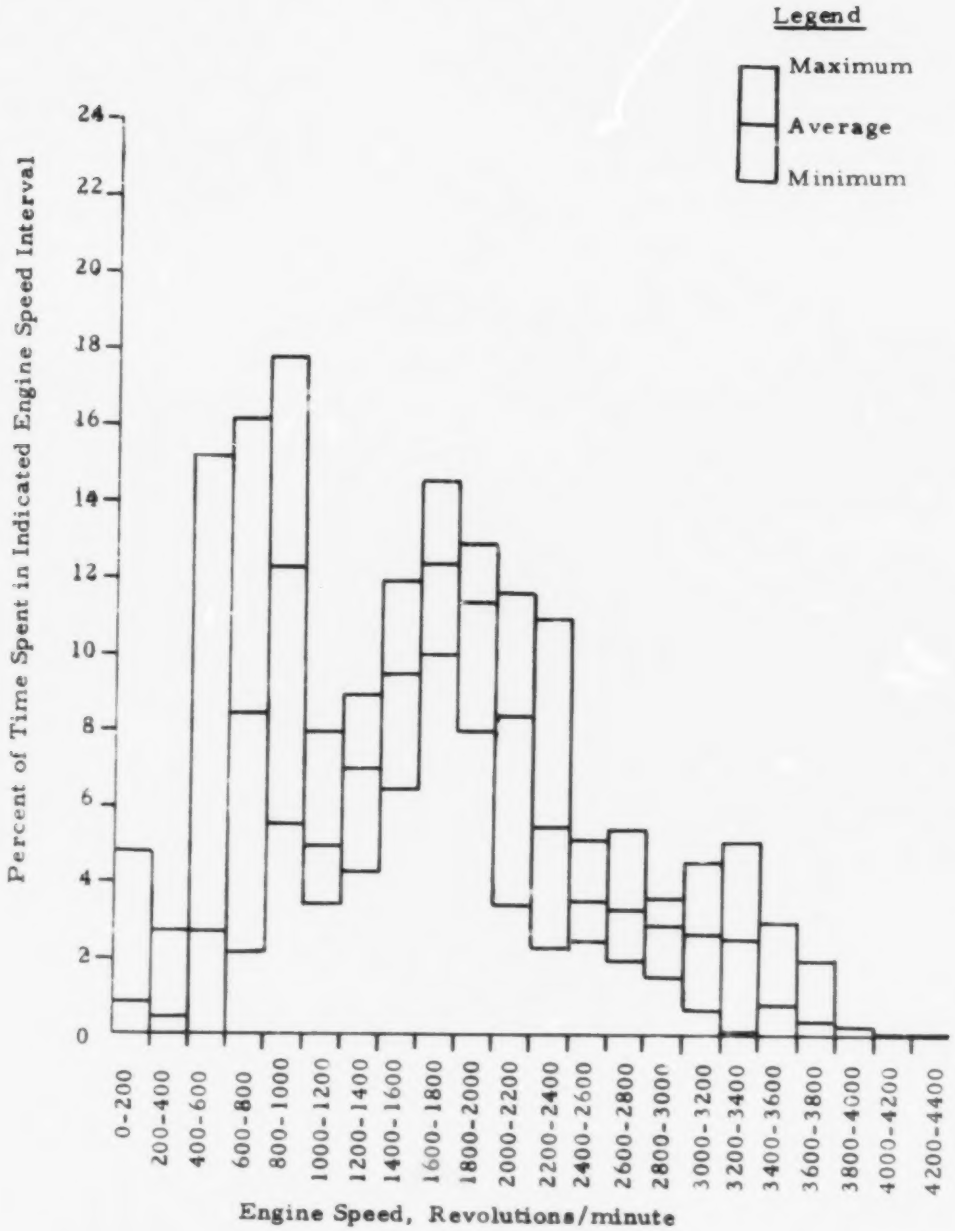

FIGURE E-2. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-2

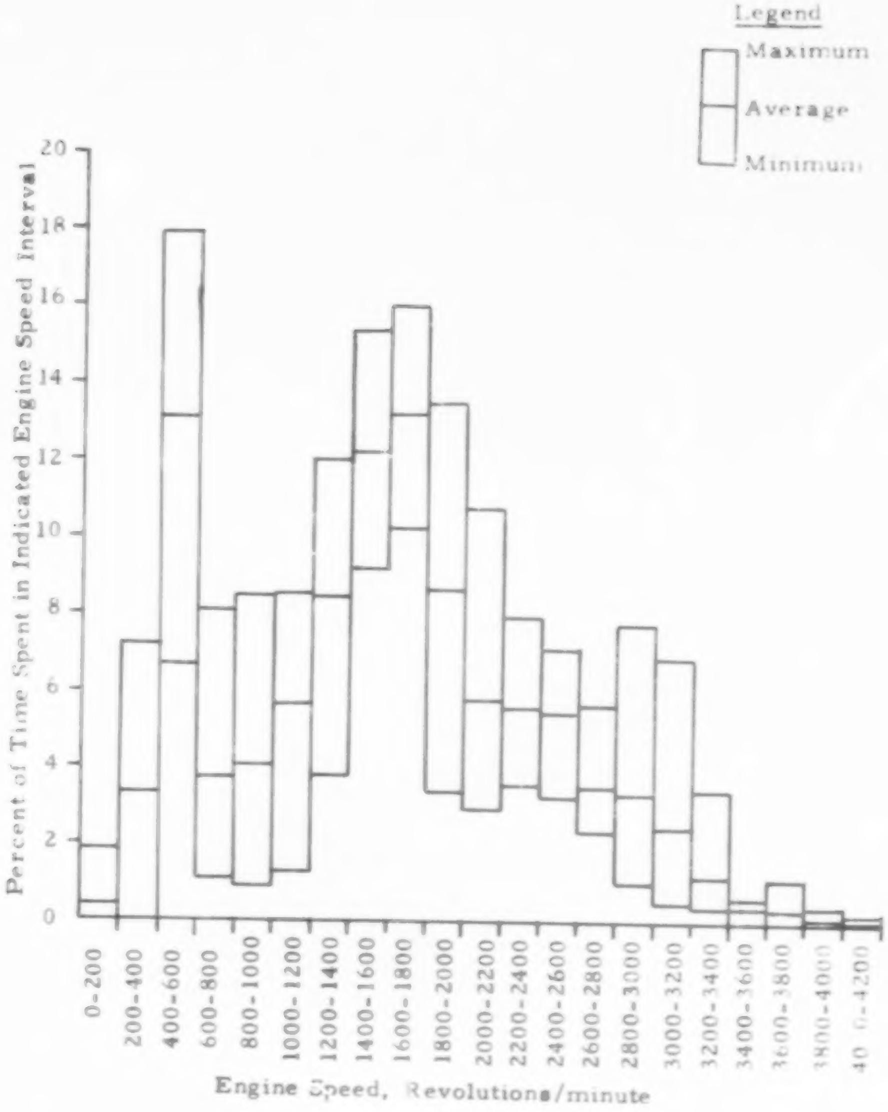

FIGURE E-5. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-5

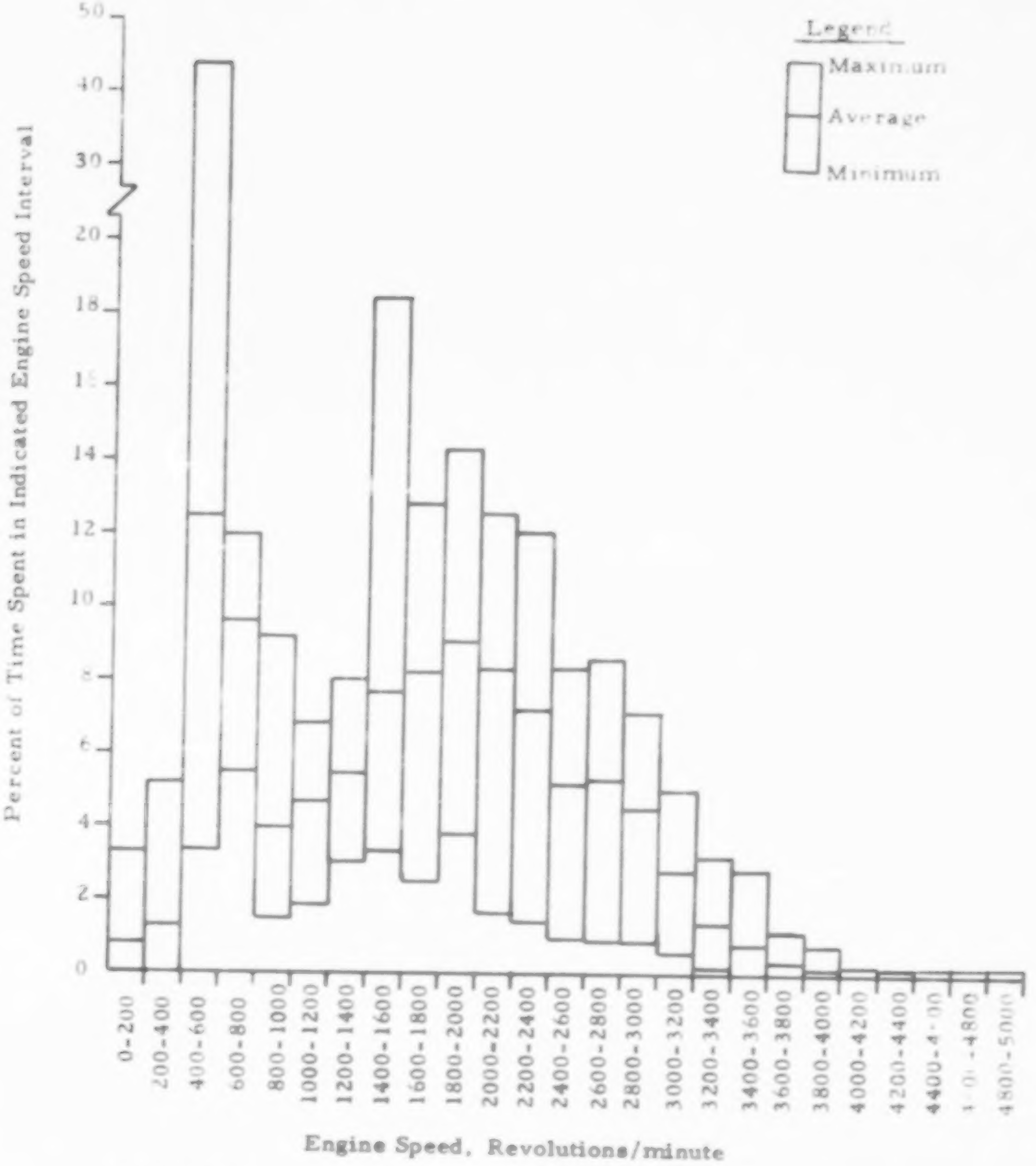

FIGURE E-6. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-6

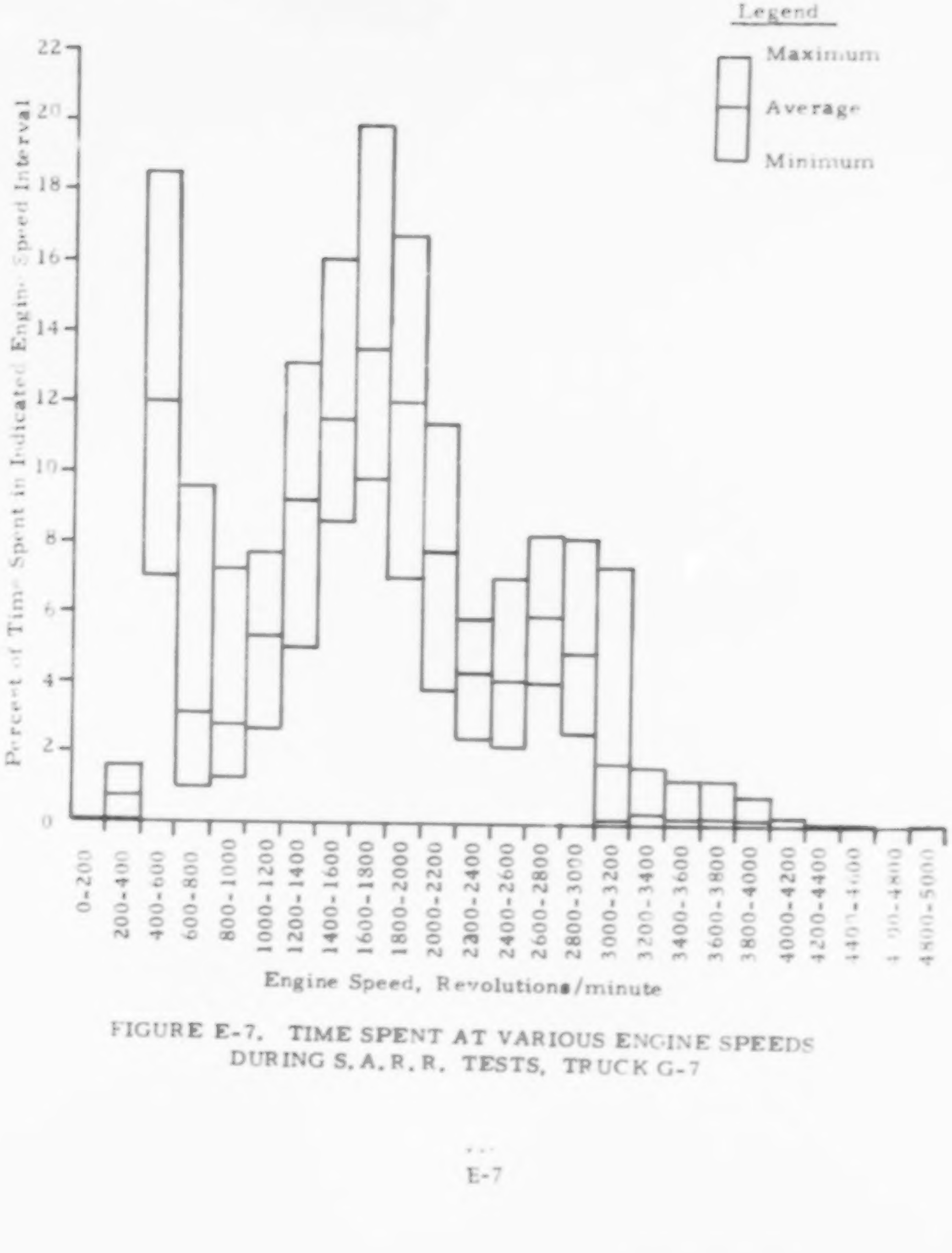

FIGURE E-7. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-7

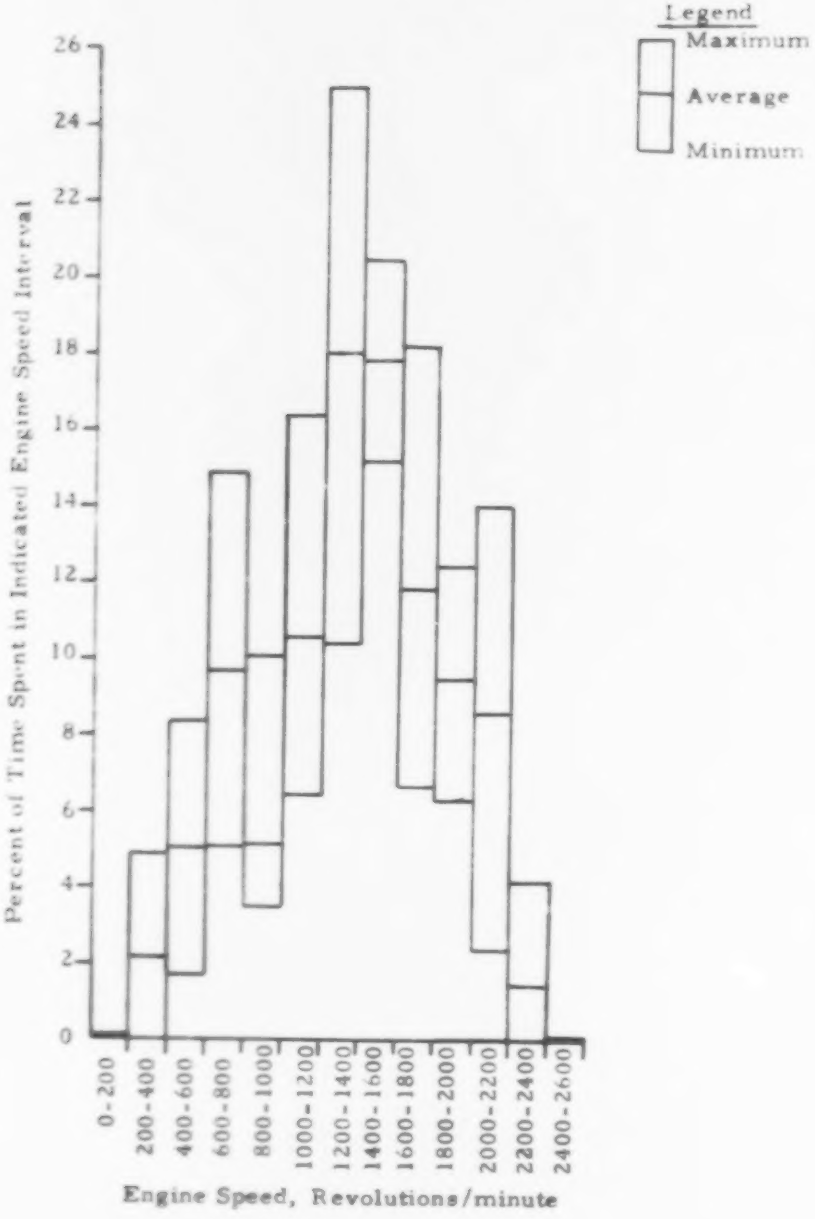

FIGURE E-8. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S. A. R. R. TESTS, TRUCK G-8

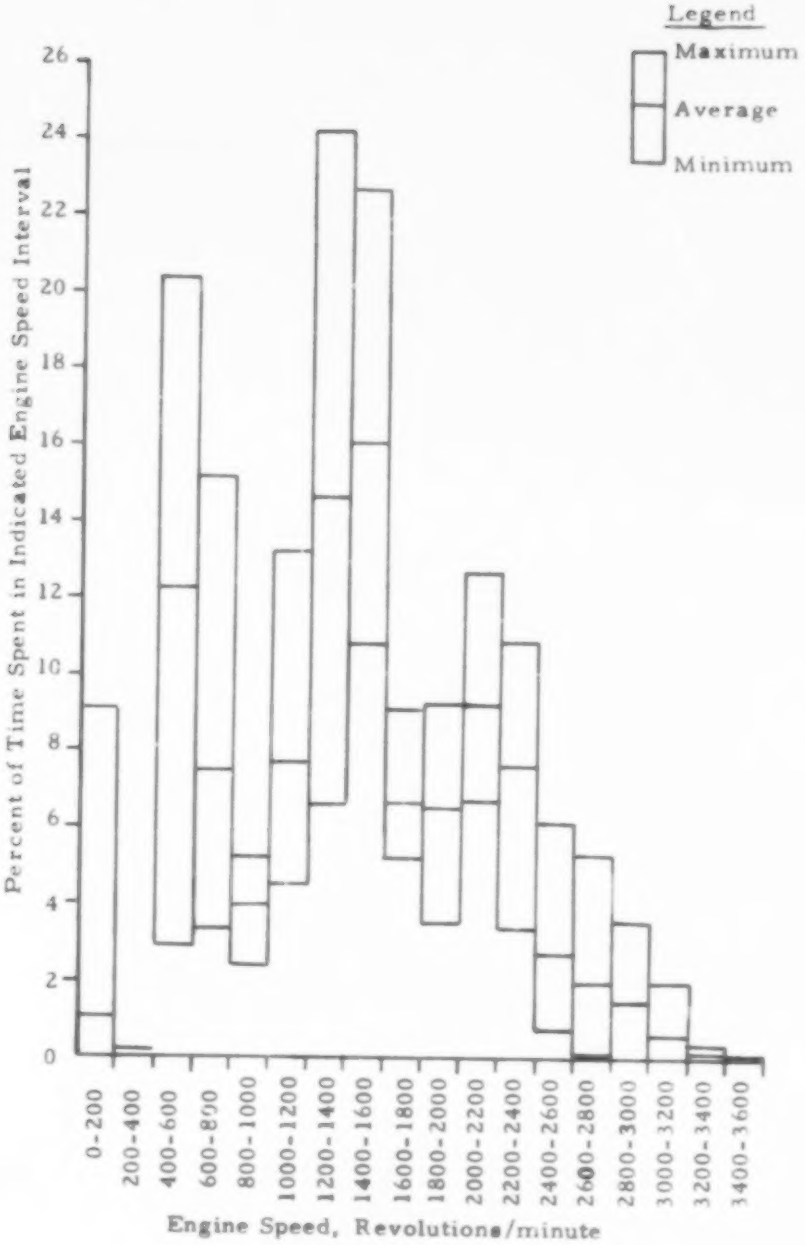

FIGURE E-9. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-9

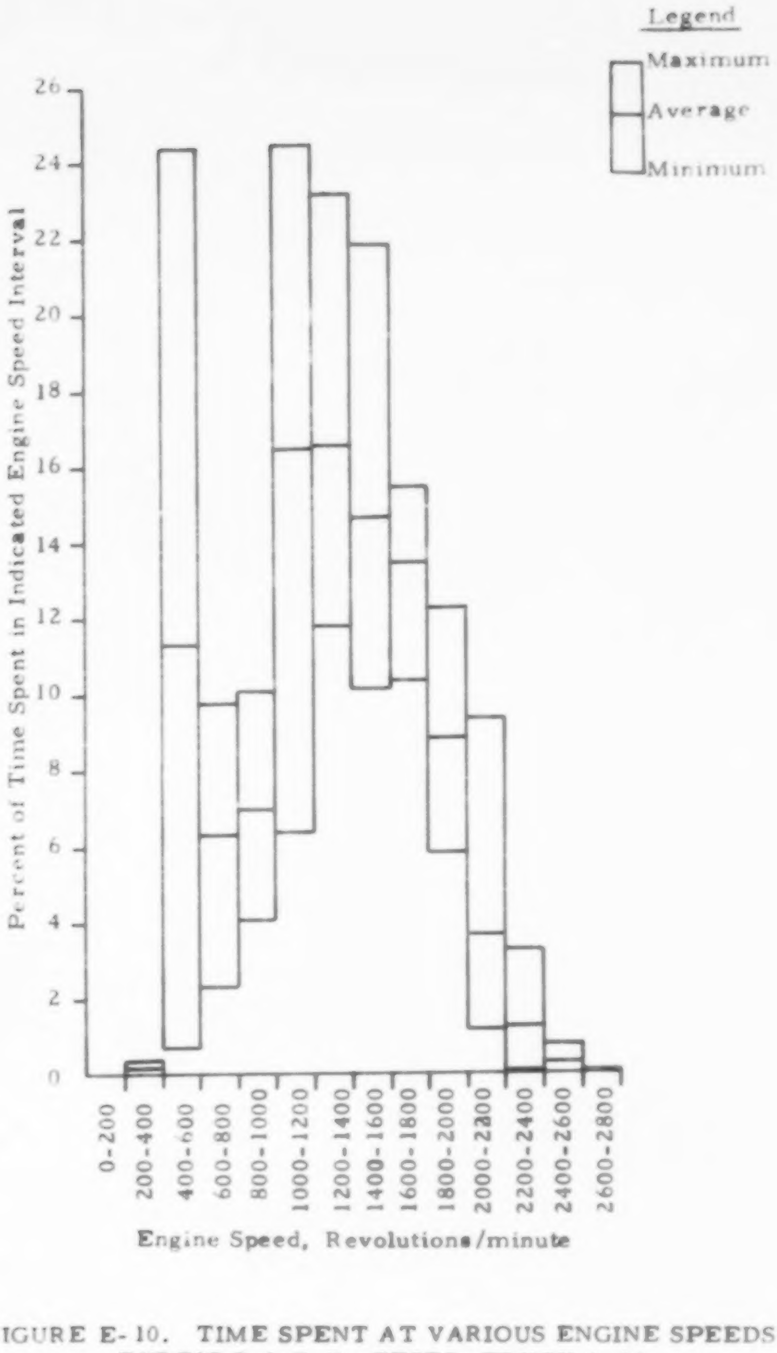

FIGURE E-10. TIME SPENT AT VARIOUS ENGINE SPEEDS DURING S. A. R. R. TESTS, TRUCK G-10

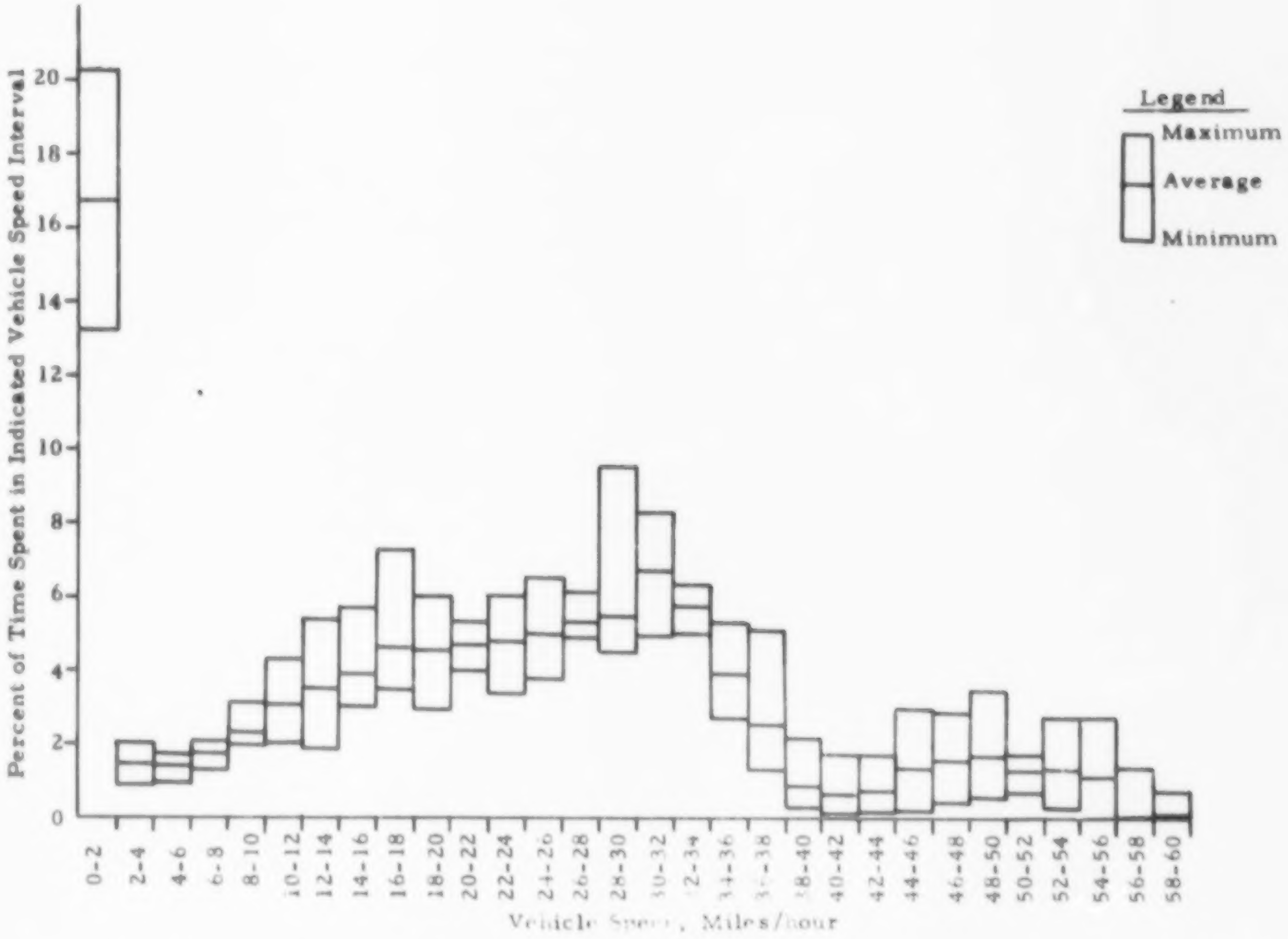

FIGURE E-11. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-1

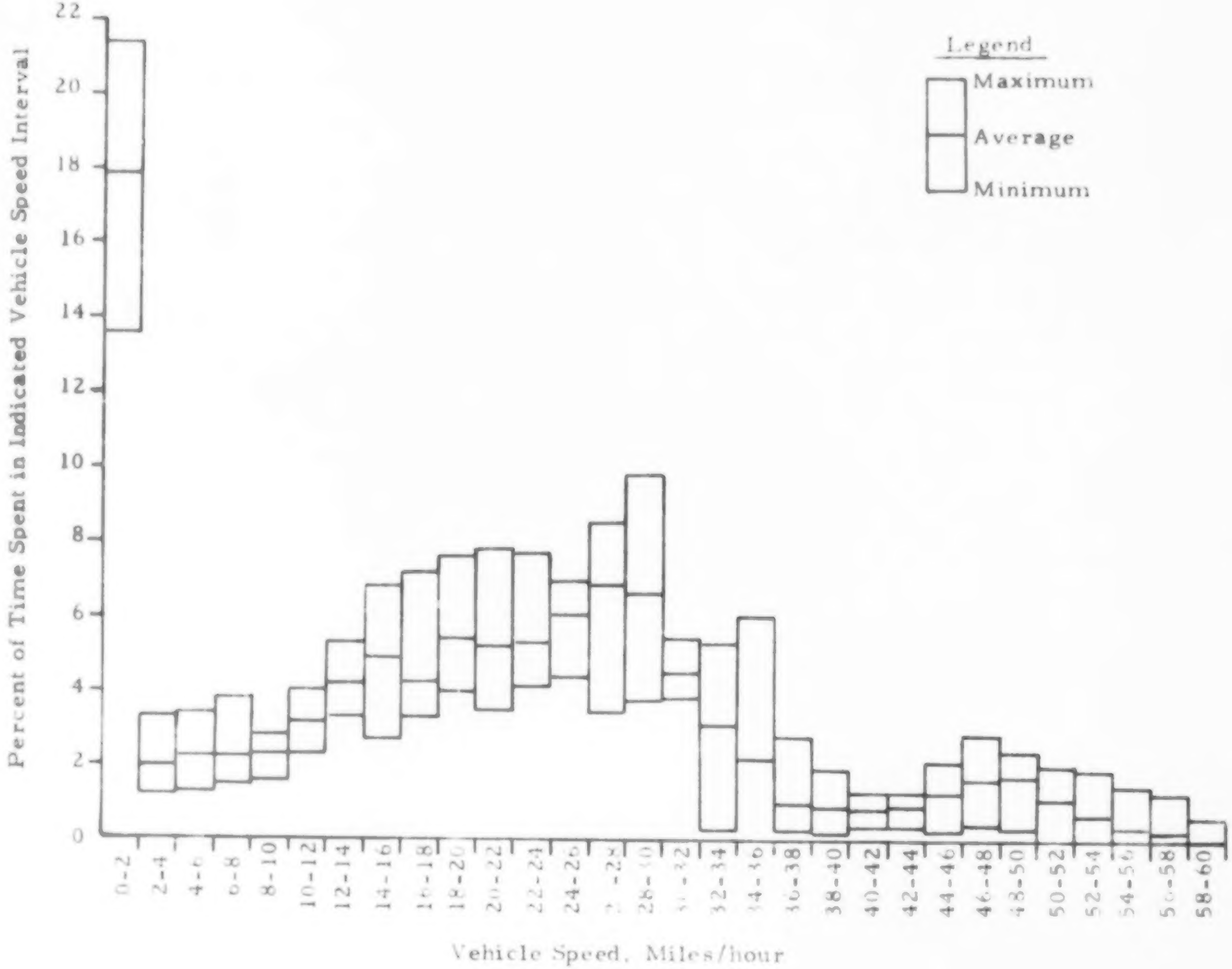

FIGURE E-12. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-2

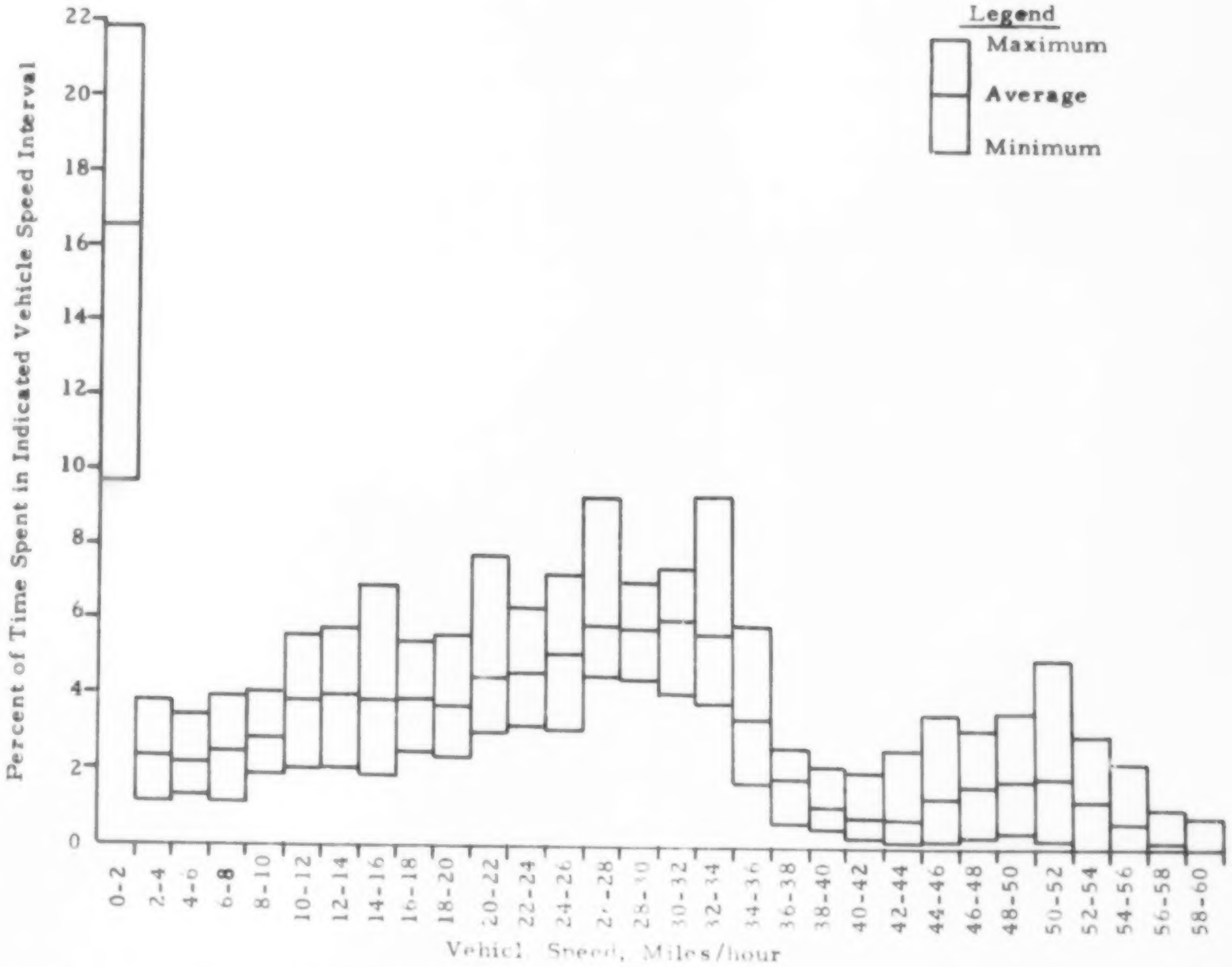

FIGURE E-13. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S. A. R. R. TESTS, TRUCK G-3

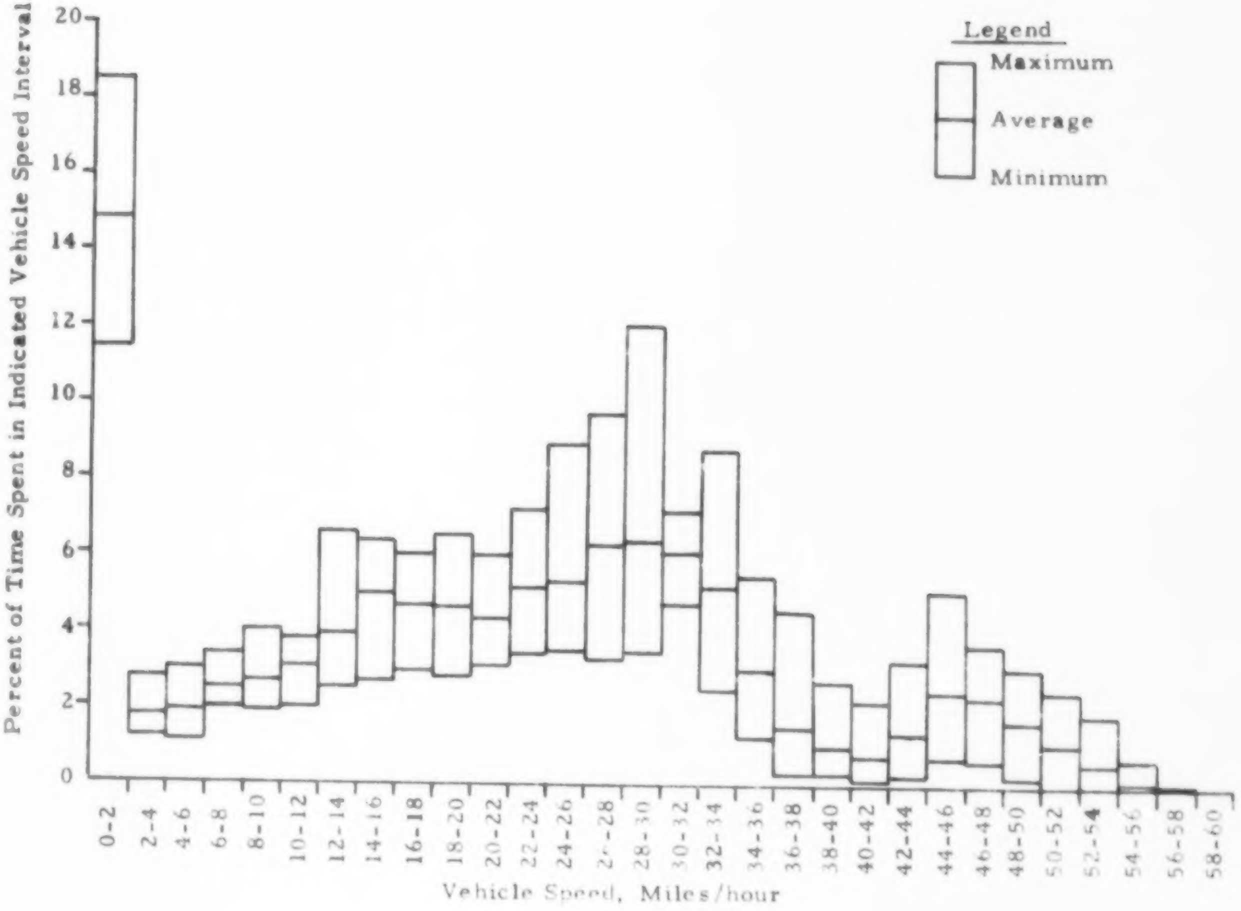

FIGURE E-14. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-4

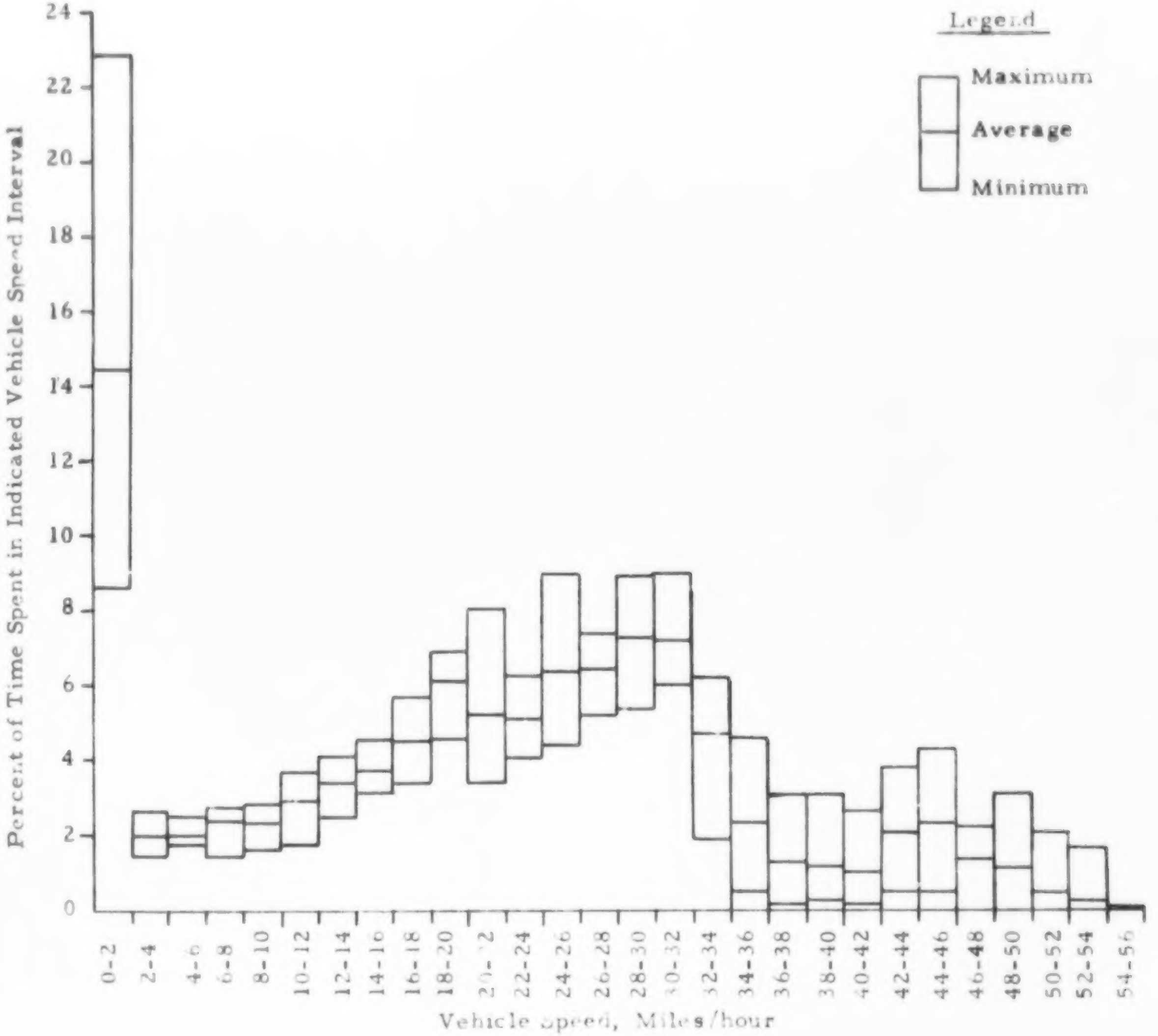

FIGURE E-15. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-5

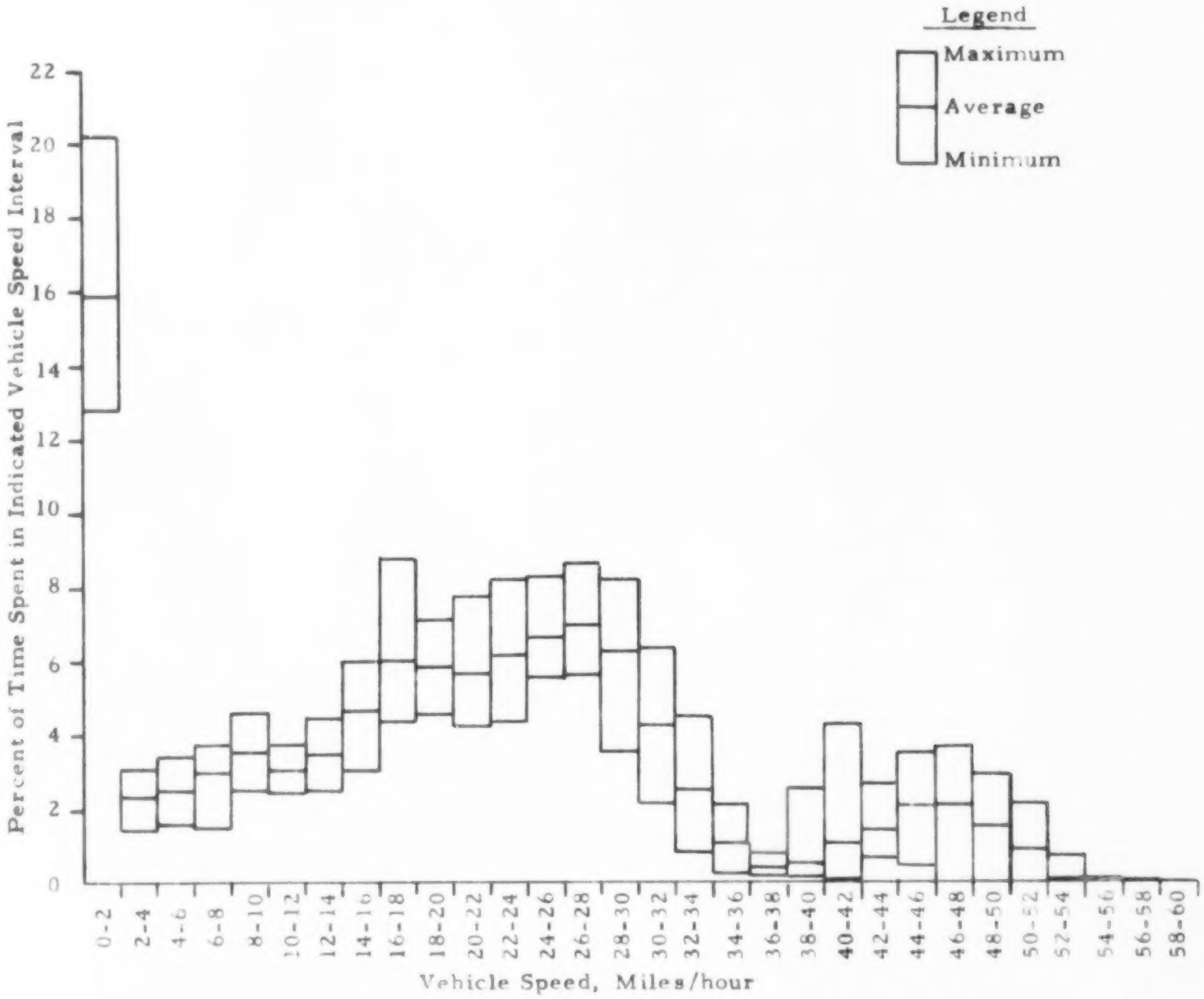

FIGURE E-16. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-6

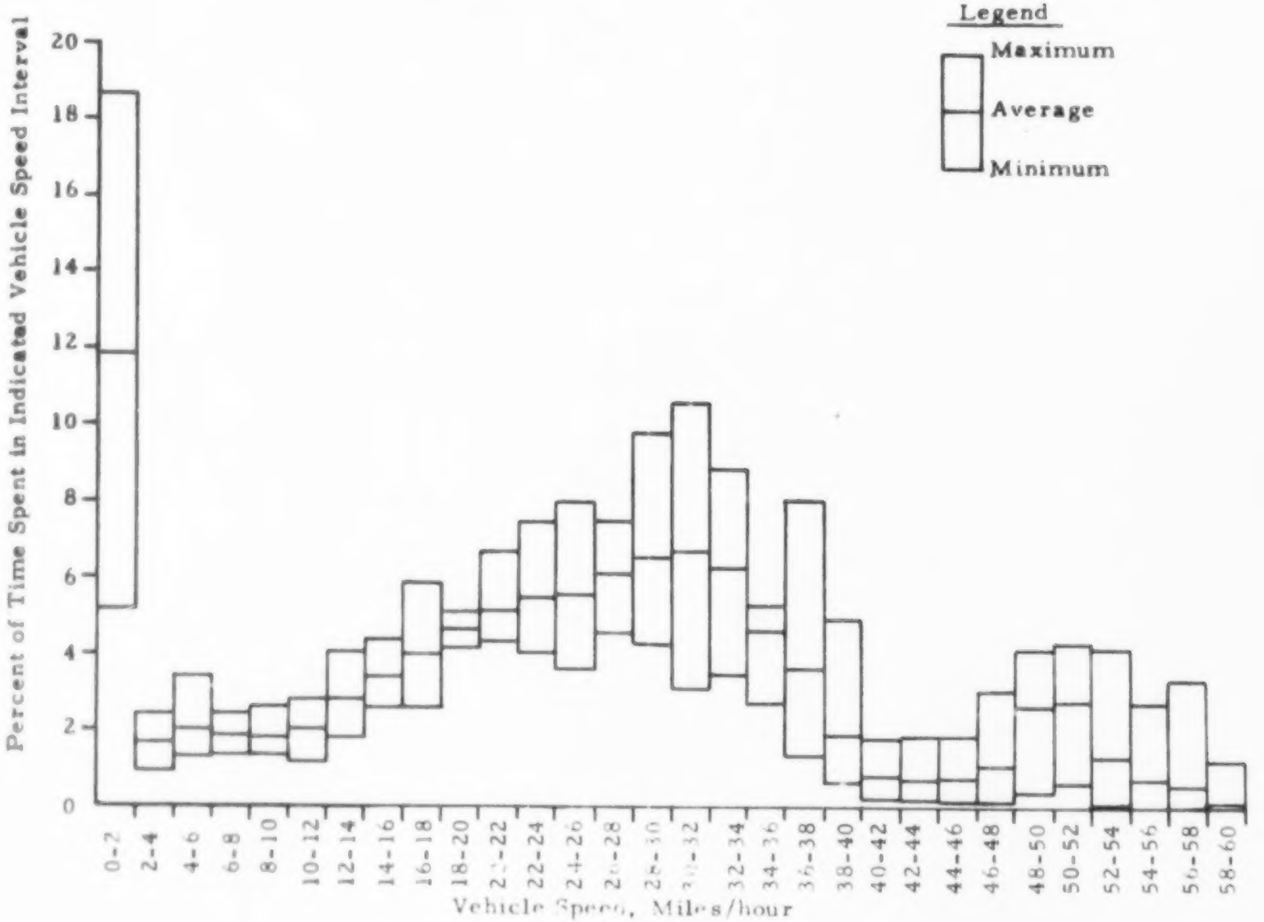

FIGURE E-17. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-7

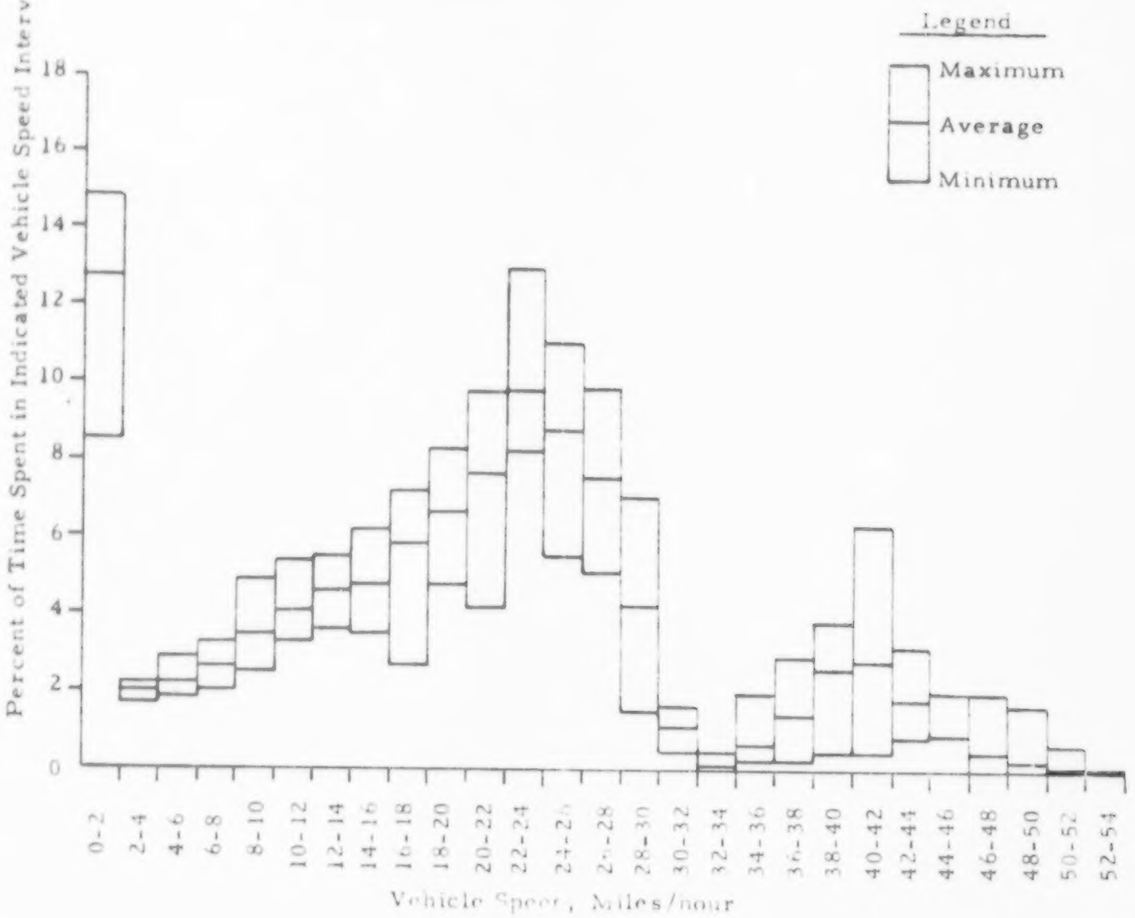

FIGURE E-18. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-8

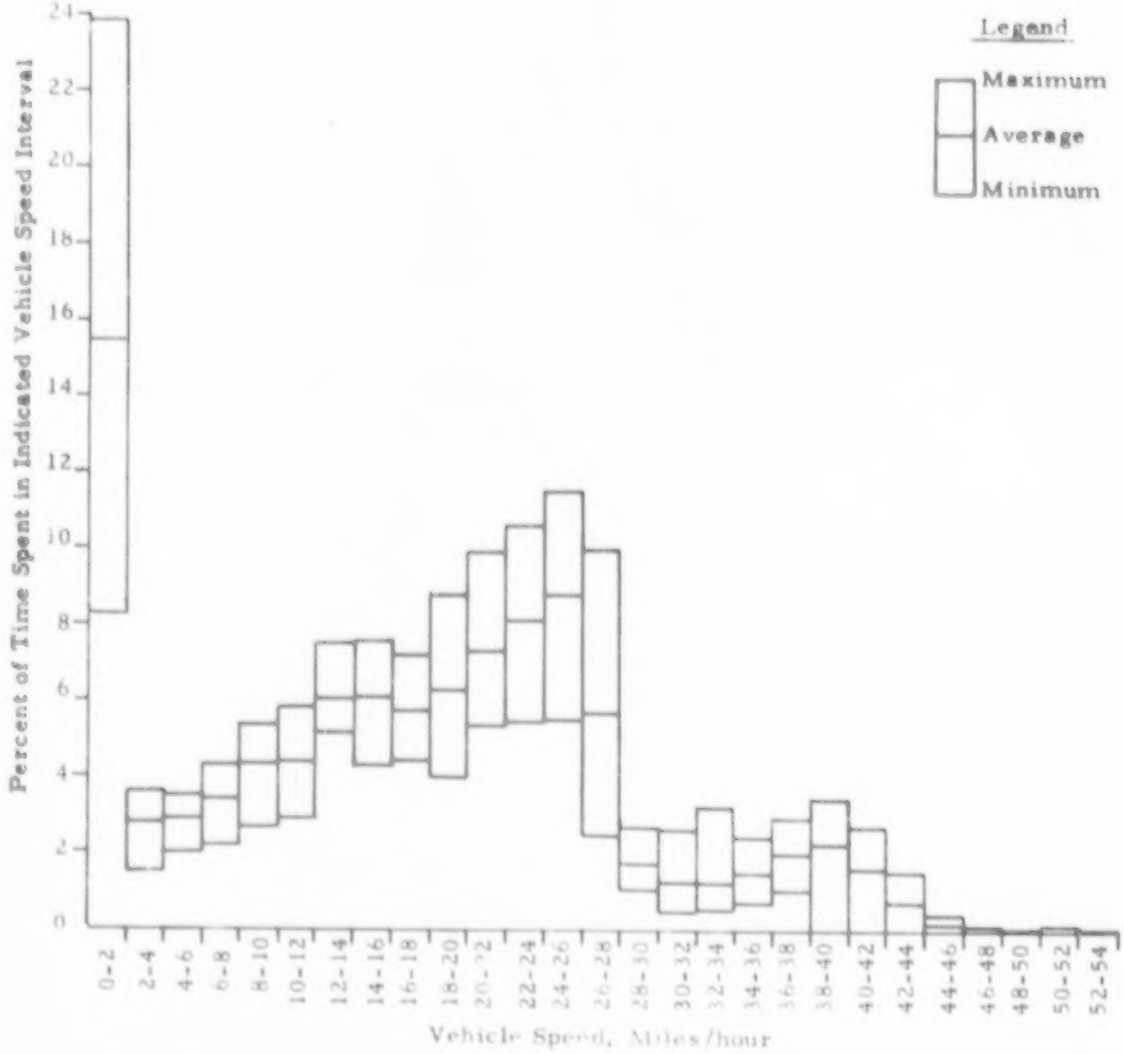

FIGURE E-19. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS, TRUCK G-9

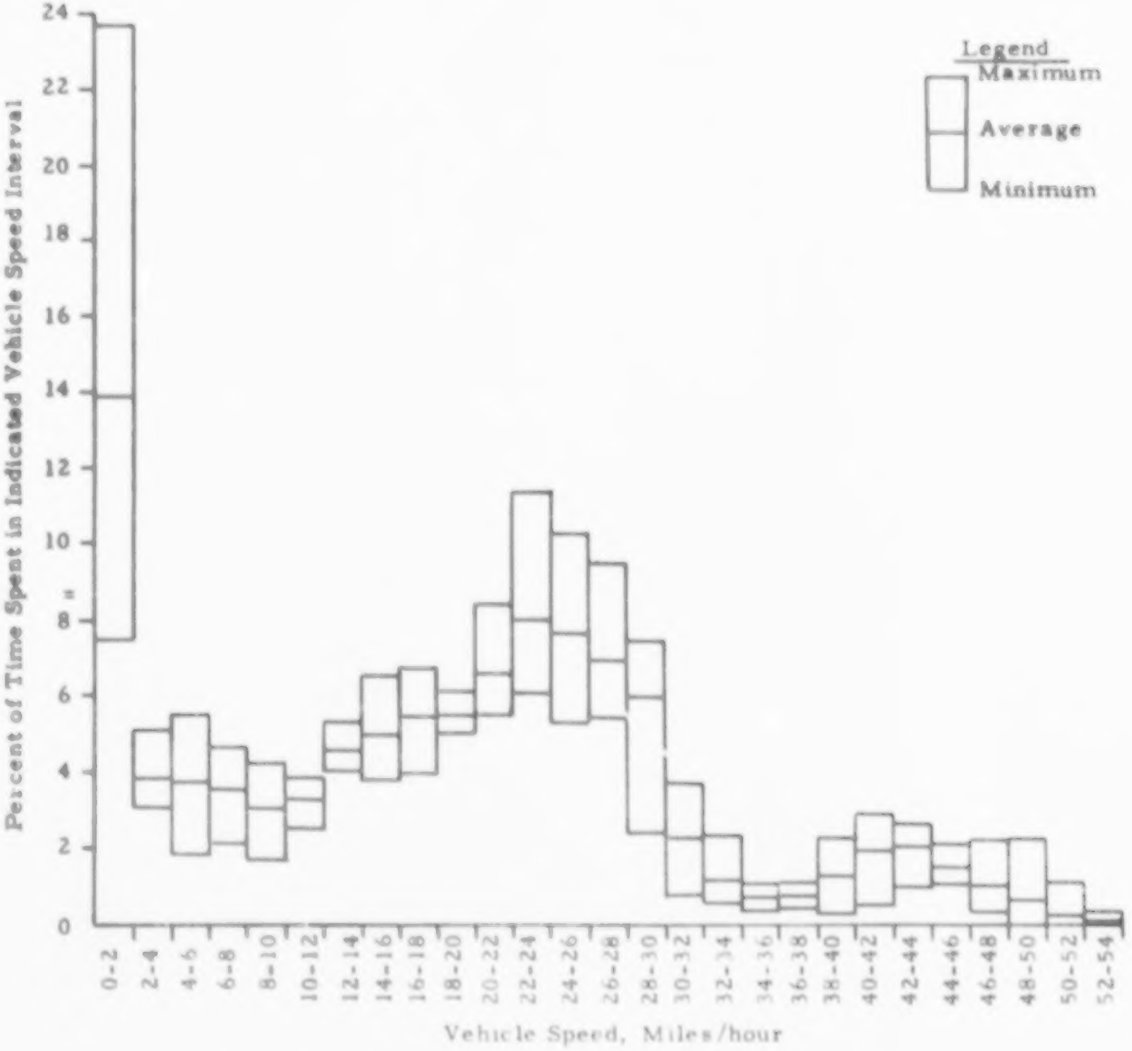

FIGURE E-20. TIME SPENT AT VARIOUS VEHICLE SPEEDS DURING S.A.R.R. TESTS TRUCK G-10

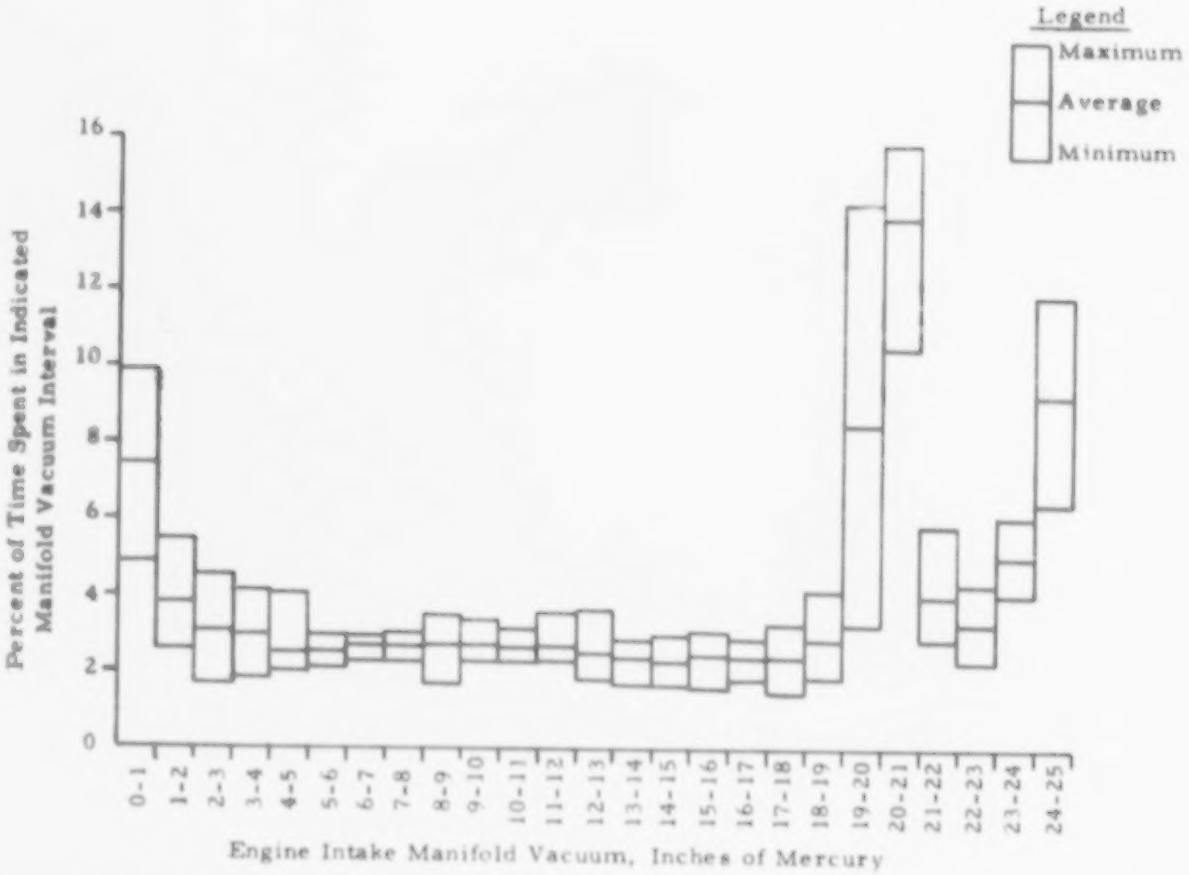

FIGURE E-21. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-1

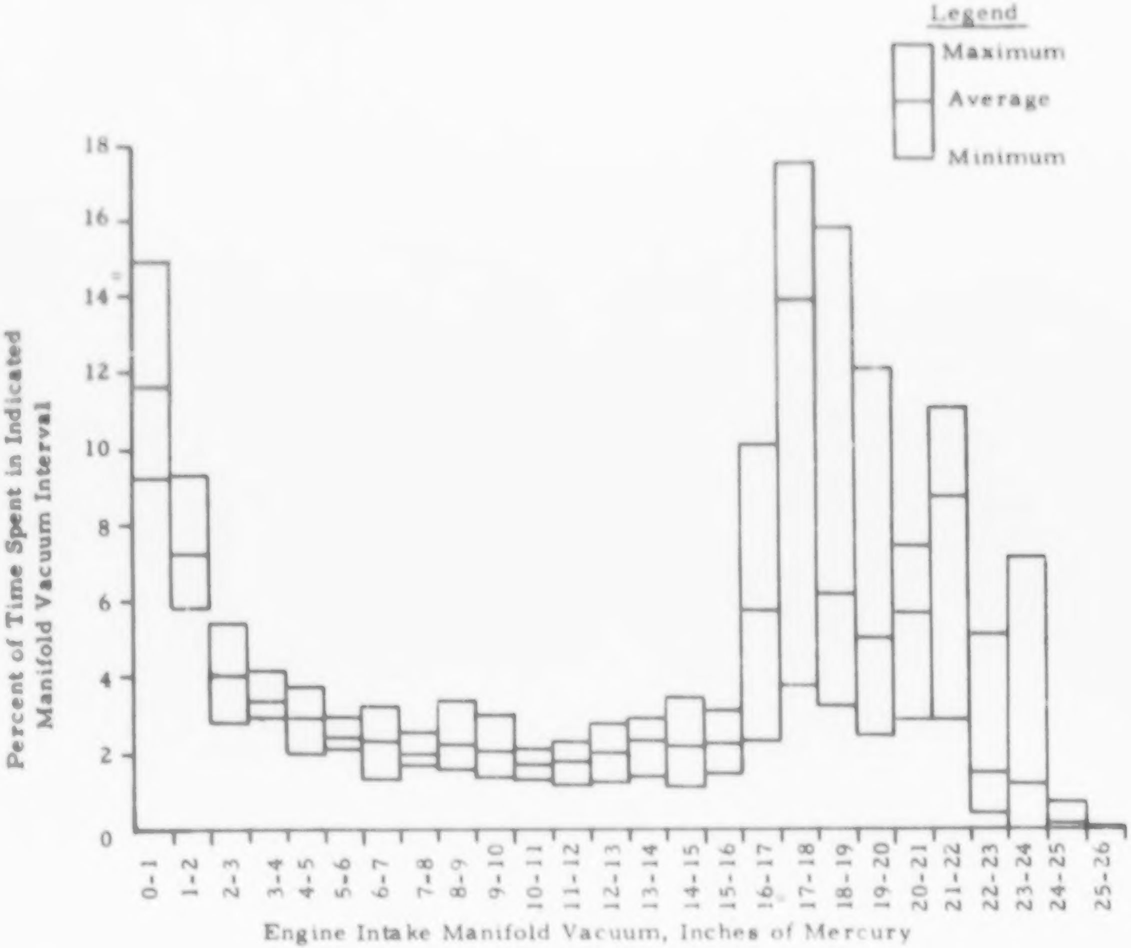

FIGURE E-22. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-2

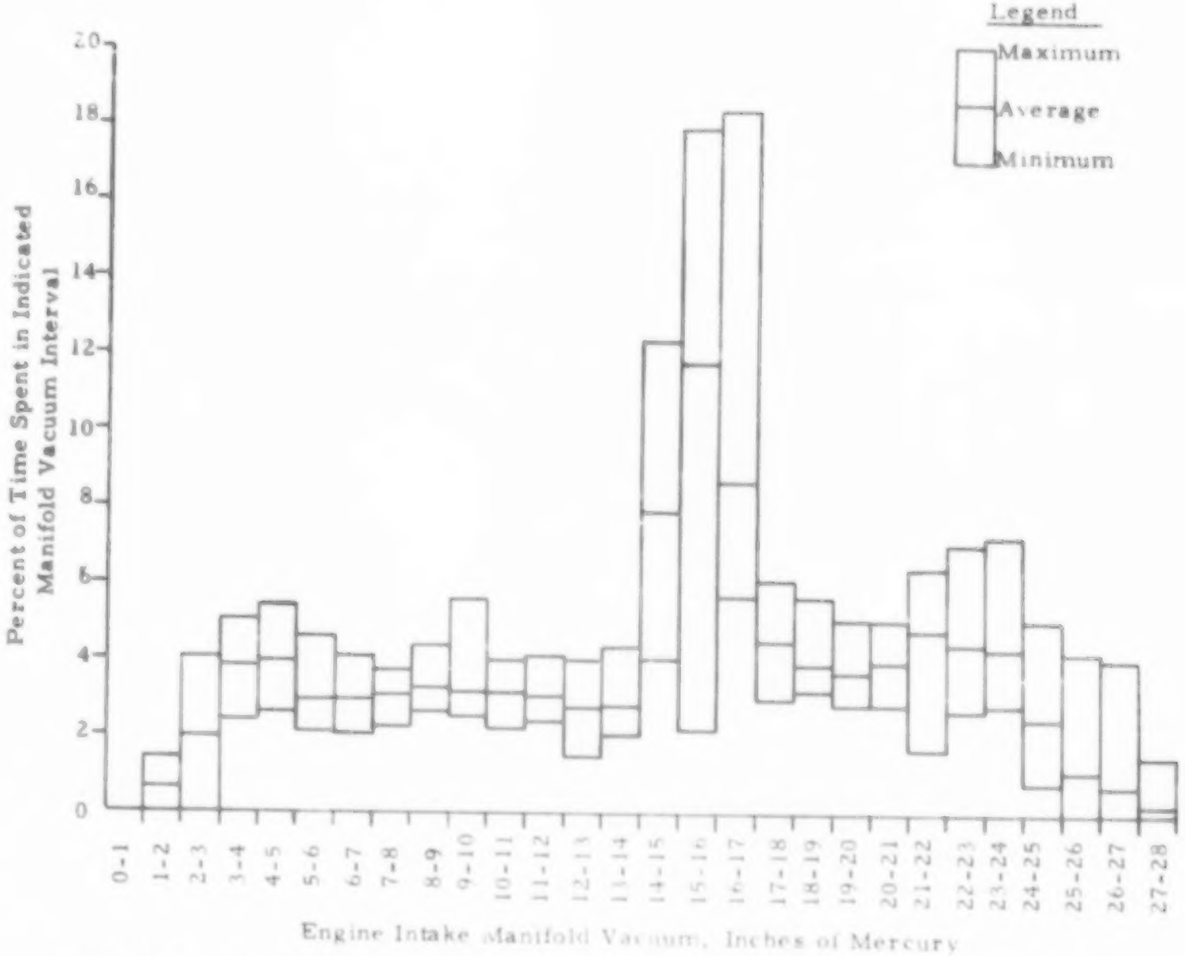

FIGURE E-23. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S. A. R. R. TESTS, TRUCK G-3

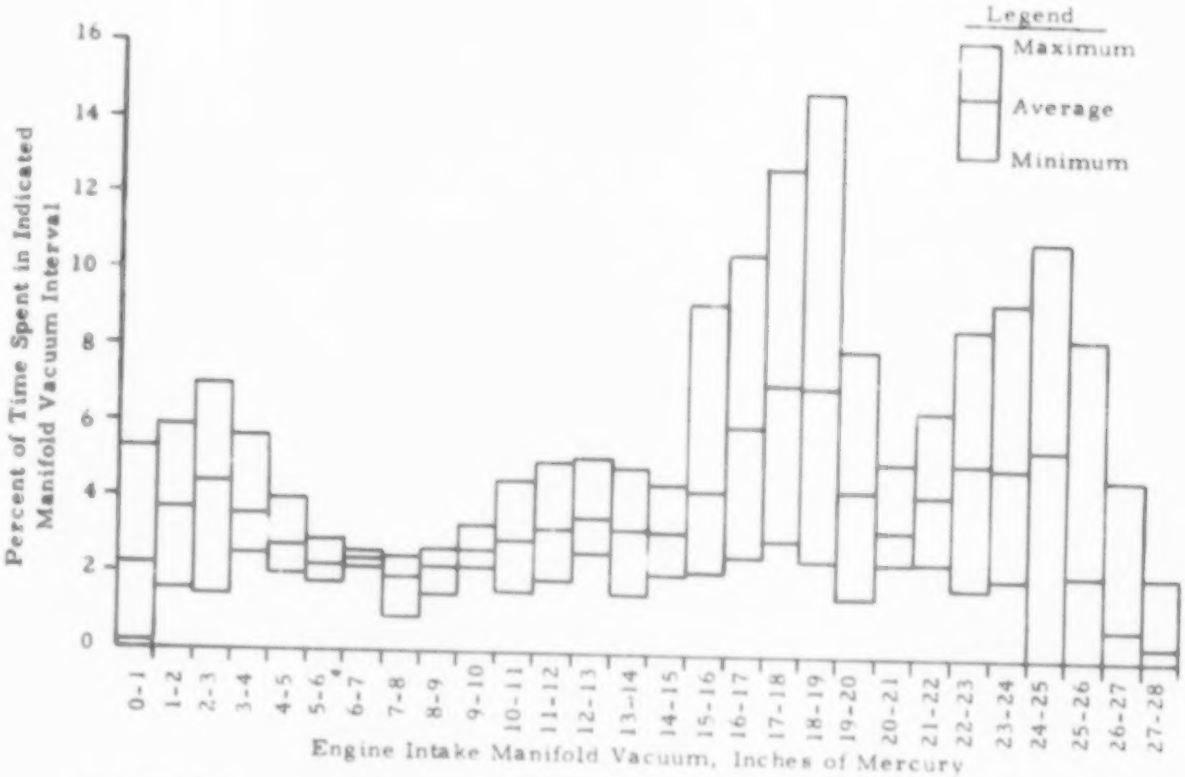

FIGURE E-24. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-4

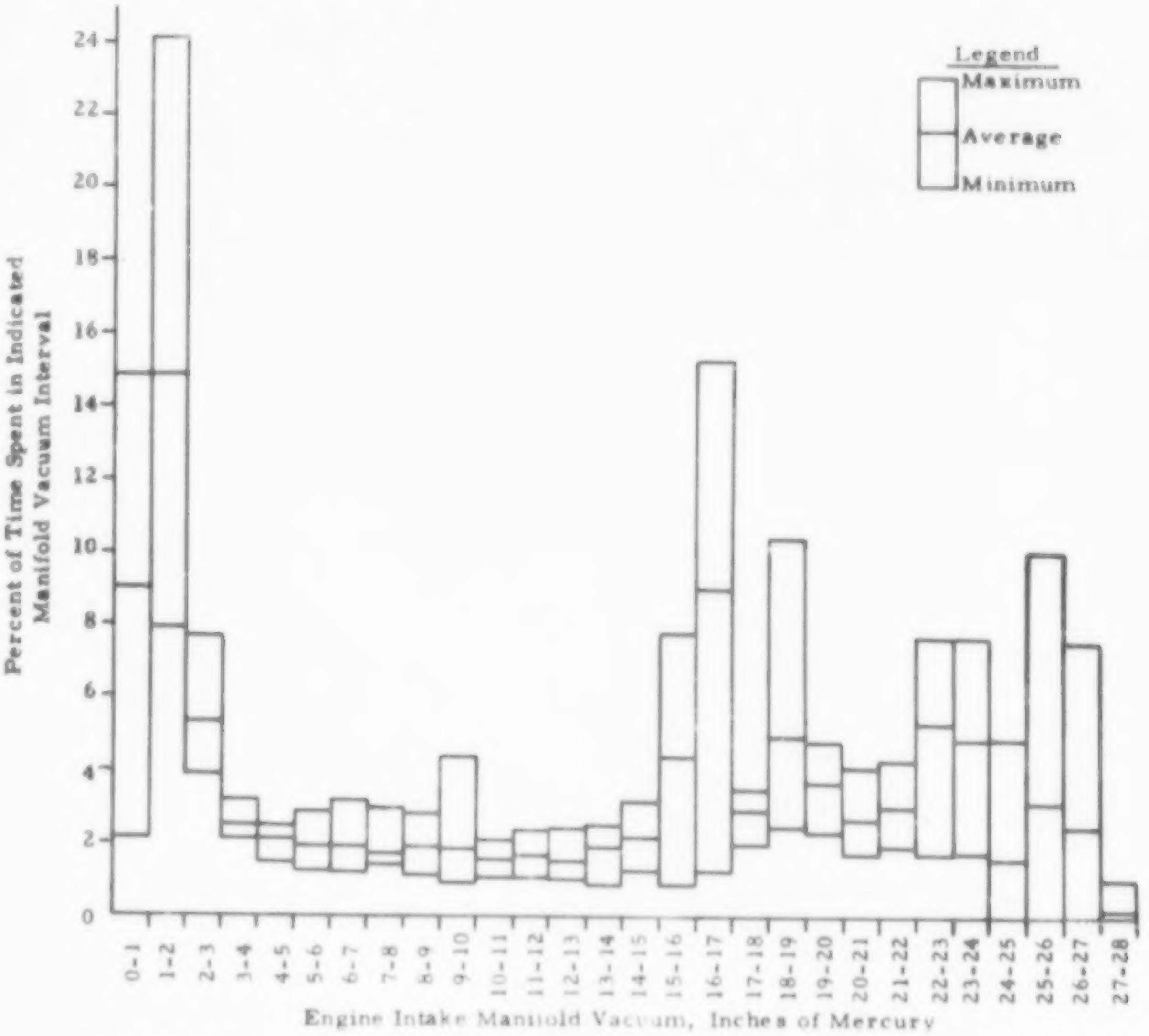

FIGURE E-25. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S. A. P. R. TESTS, TRUCK G-5

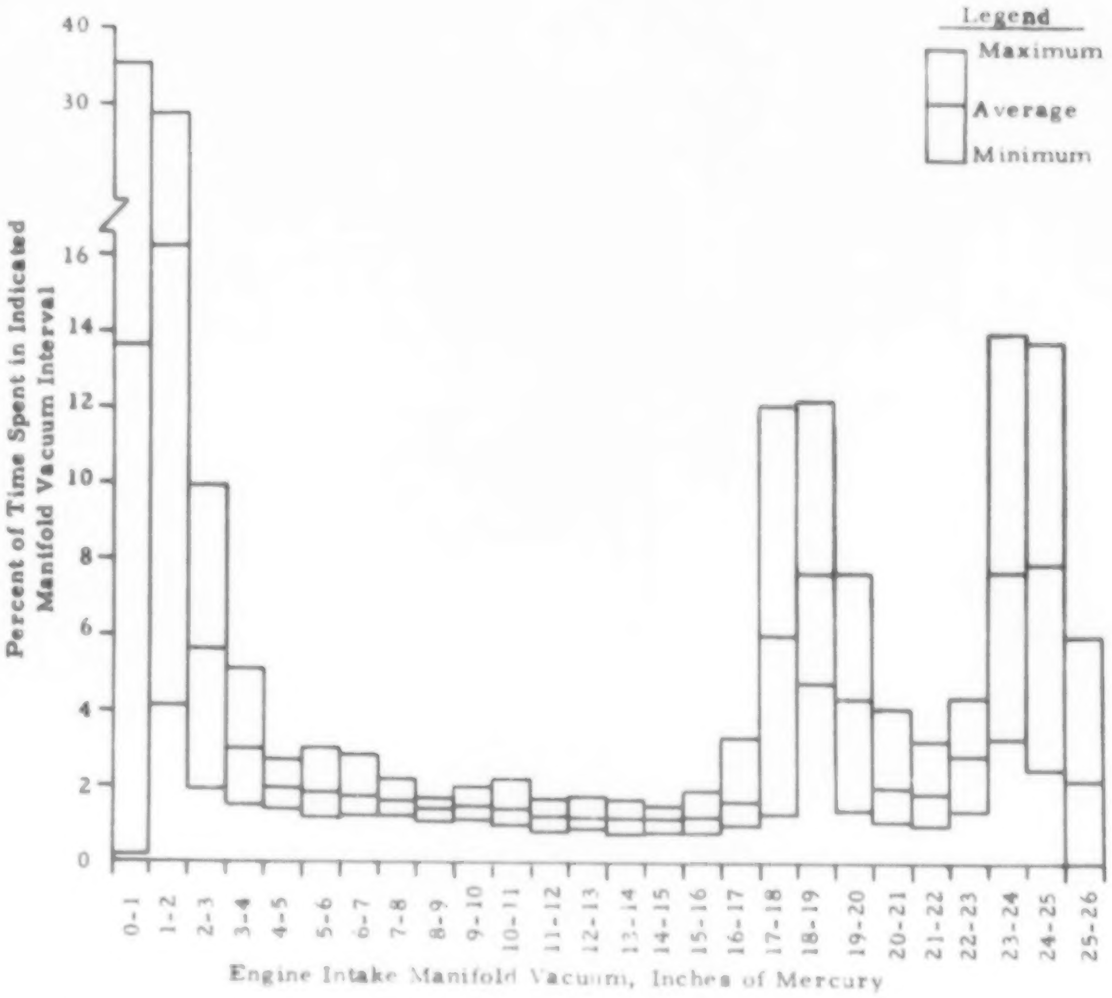

FIGURE E-26. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-6

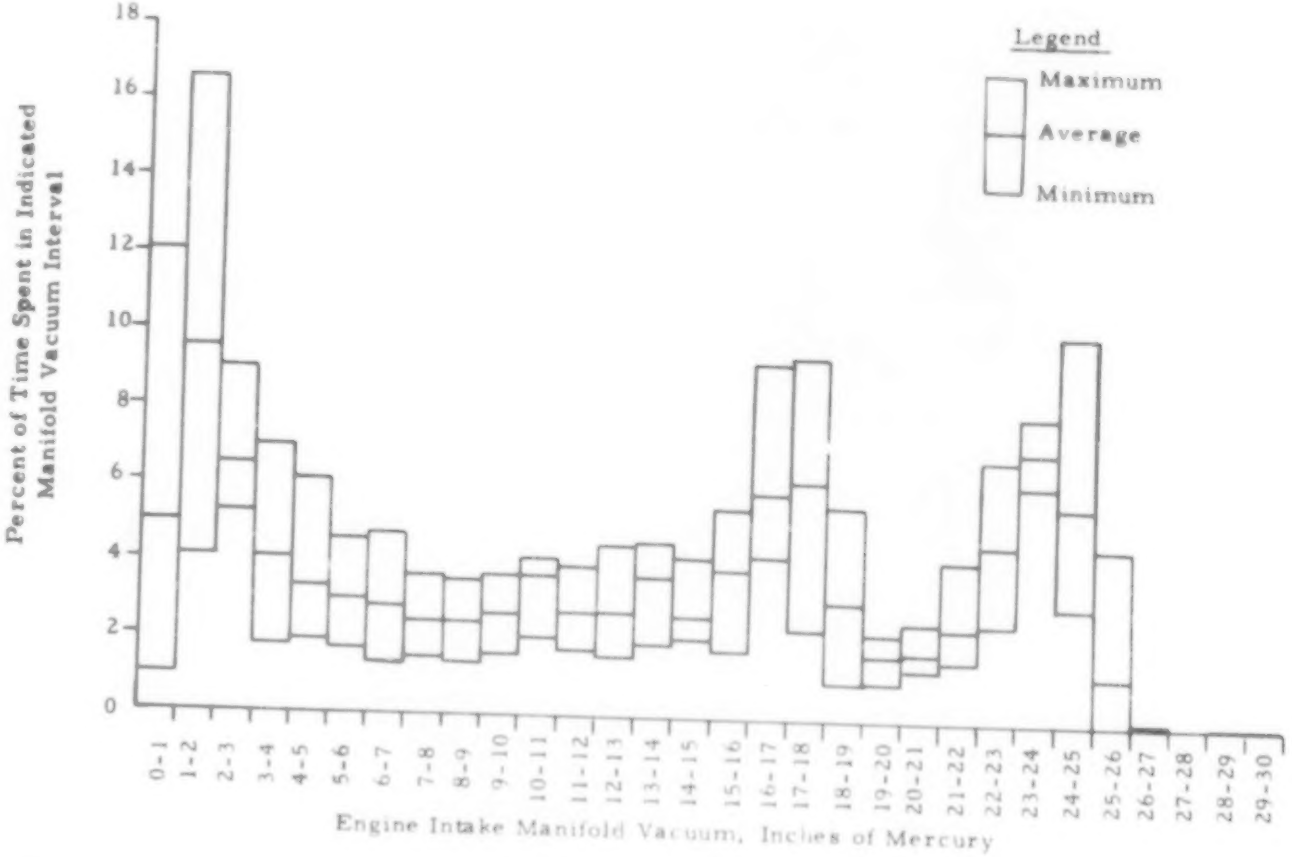

FIGURE E-27. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-7

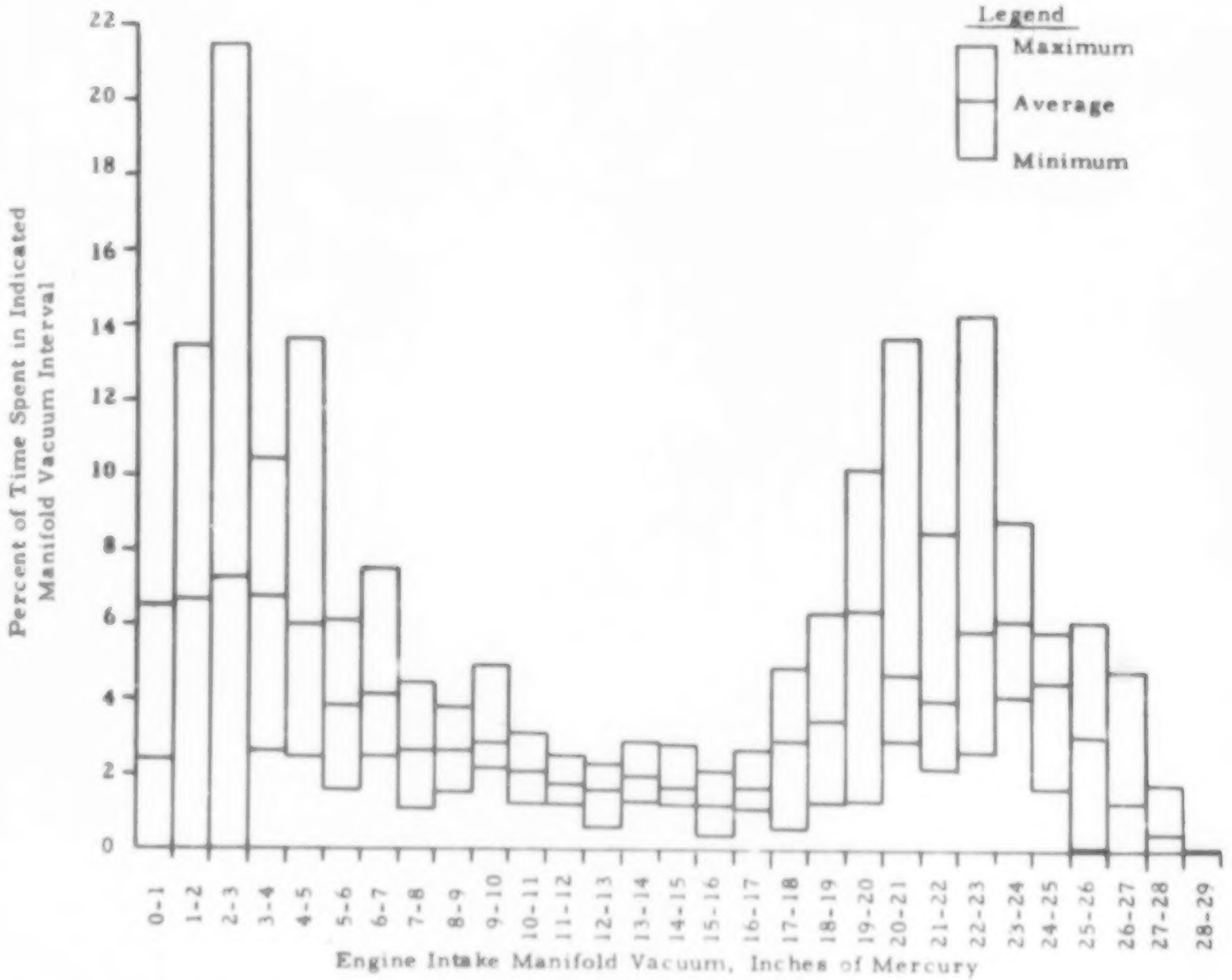

FIGURE E-28. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-8

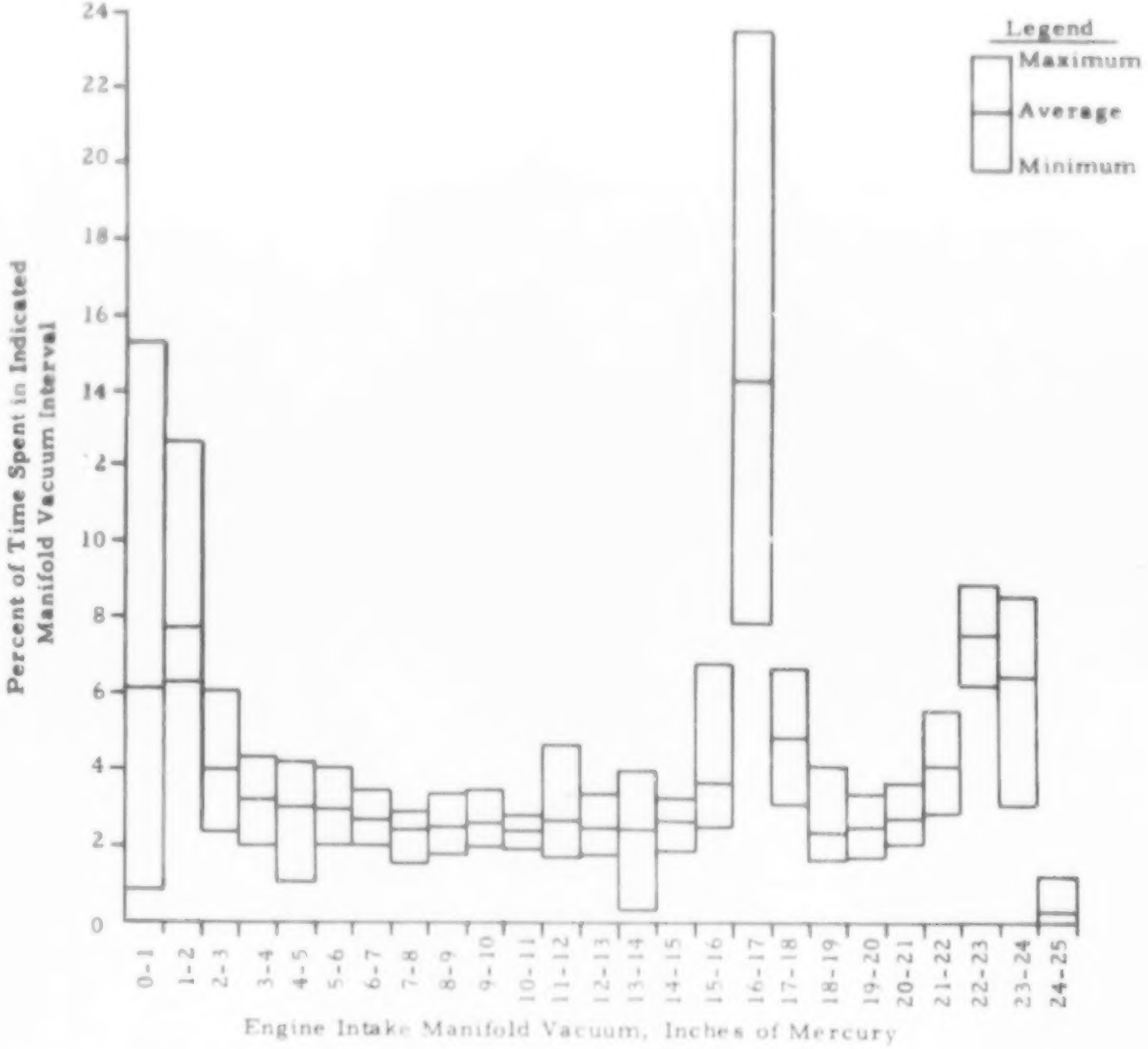

FIGURE E-29. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS, TRUCK G-9

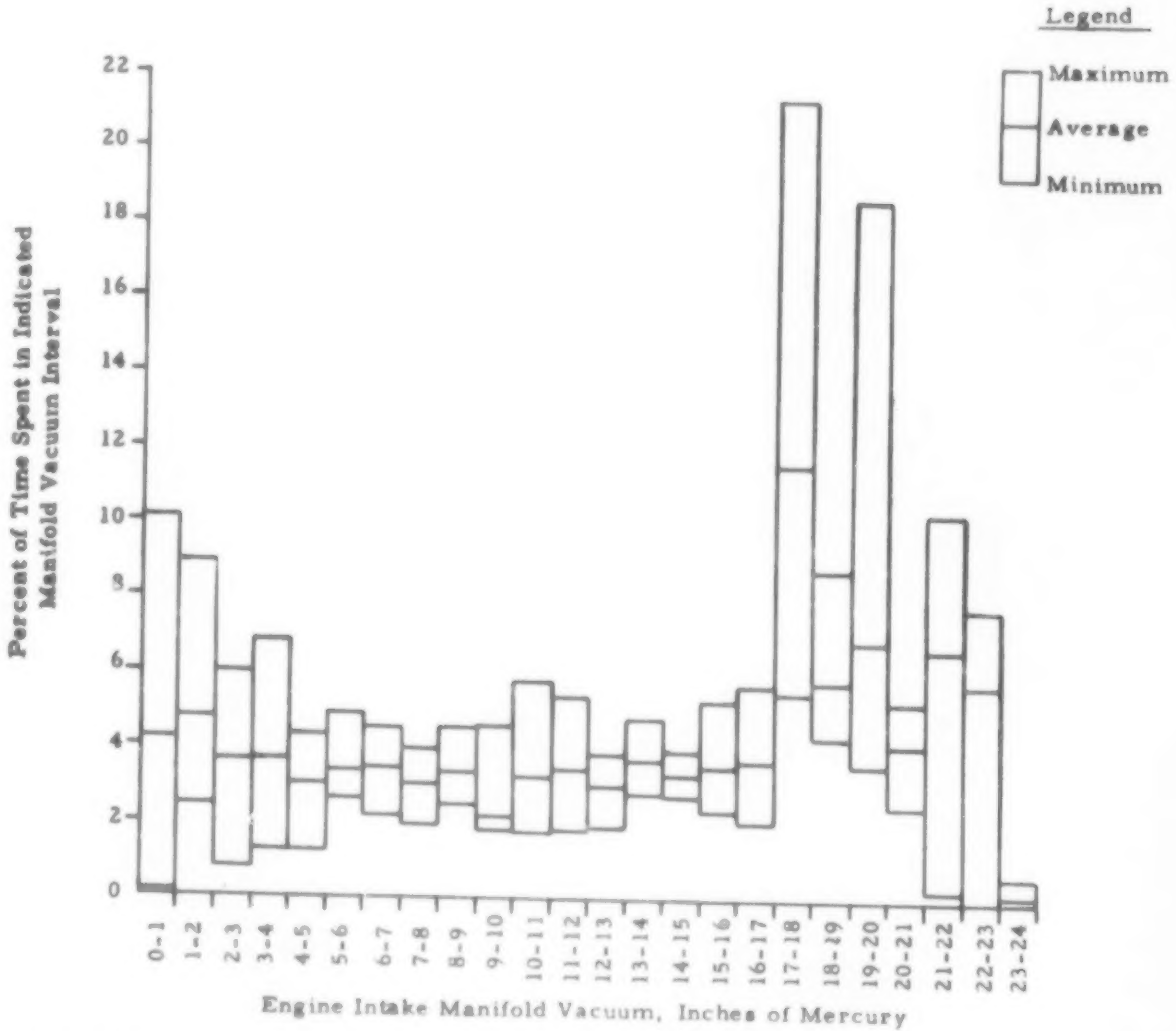

FIGURE E-30. TIME SPENT AT VARIOUS INTAKE MANIFOLD VACUUM INTERVALS DURING S.A.R.R. TESTS. TRUCK G-10

APPENDIX F

EMISSION RESULTS FROM INDIVIDUAL TEST RUNS ON THE SAN ANTONIO ROAD ROUTE (SARR) FOR TEN PRECONTROLLED GASOLINE-POWERED TRUCKS

TRUCK G-1

1967 FORD 17000 LB GVW VAN
WITH 330 CID V8 ENGINE
(8 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER G-1

DATE  7/19/74              TIME  1100 HRS.         TEST NO. 1
MODEL  1967 FORD           BOX VAN                 ENGINE 330 CID V8
DRIVER  TLC                TEST WT. 12400 LB.      GVW17000 LB.

WET BULB TEMP  78 F        DRY BULB TEMP  94 F     REL. HUM.  48.9 PCT
SPEC. HUM.  48.9 GRAIN/LB  BARO.  29.62 IN. HG.    MEASURED FUEL  7.47 LB.

  RUN DURATION           19.49 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      120  DEG. F
  BLOWER REVOLUTIONS   22589
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    84.7/3
   HC   SAMPLE  PPM                                    847
   HC   BACKGRD METER READING/SCALE                     1.2/3
   HC   BACKGRD PPM                                     12
   CO   SAMPLE  METER READING/SCALE                    42.8/1
   CO   SAMPLE  PPM                                   3815
   CO   BACKGRD METER READING/SCALE                     1.3/2
   CO   BACKGRD PPM                                     37
   CO2  SAMPLE  METER READING/SCALE                    40.9/2
   CO2  SAMPLE  PERCENT                                 1.13
   CO2  BACKGRD METER READING/SCALE                     2.5/2
   CO2  BACKGRD PERCENT                                 .06
   NOX  SAMPLE  METER READING/SCALE                    68.7/2
   NOX  SAMPLE  PPM                                    68.7
   NOX  BACKGRD METER READING/SCALE                     .7/3
   NOX  BACKGRD PPM                                     2.1

   HC   CONCENTRATION PPM                              836
   CO   CONCENTRATION PPM                             3640
   CO2  CONCENTRATION PCT                              1.07
   NOX  CONCENTRATION PPM                              66.8
   HC   MASS (GRAMS)                                 176.04
   CO   MASS (GRAMS)                                1546.62
   CO2  MASS (GRAMS)                                7187.19
   NOX  MASS (GRAMS)                                  46.66

HC   GRAMS/MILE  24.41
CO   GRAMS/MILE  213.6
CO2  GRAMS/MILE    993
NOX  GRAMS/MILE   6.44

HC   GRAMS/LB OF FUEL  23.57     HC   GRAMS/MIN   9.03
CO   GRAMS/LB OF FUEL  207.0     CO   GRAMS/MIN   79.4
CO2  GRAMS/LB OF FUEL    962     CO2  GRAMS/MIN    369
NOX  GRAMS/LB OF FUEL   6.25     NOX  GRAMS/MIN   2.39


TOTAL CARBON = 2777.18 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.07 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER G-1

DATE  7/19/74                   TIME  1130 HRS.           TEST NO.  2
MODEL  1967 FORD                BOX VAN                   ENGINE 330 CID V8
DRIVER  TLC                     TEST WT. 12400 LB.        GVW17000 LB.

WET BULB TEMP  78 F             DRY BULB TEMP  94 F       REL. HUM.  48.9 PCT
SPEC. HUM.  *9.0 GRAIN/LB  BARO.  29.60 IN. HG.      MEASURED FUEL  6.94 LB.

  RUN DURATION            20.22 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     12.0  IN. H2O
  BLOWER INLET TEMP.       125  DEG. F
  BLOWER REVOLUTIONS     23466
  BLOWER CU. FT./REV.     .647

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                75.2/3
   HC   SAMPLE   PPM                                 752
   HC   BACKGRD METER READING/SCALE                   .9/3
   HC   BACKGRD PPM                                    9
   CO   SAMPLE   METER READING/SCALE                94.1/2
   CO   SAMPLE   PPM                                4082
   CO   BACKGRD METER READING/SCALE                   .8/2
   CO   BACKGRD PPM                                   23
   CO2 SAMPLE   METER READING/SCALE                 35.3/2
   CO2 SAMPLE   PERCENT                              .96
   CO2 BACKGRD METER READING/SCALE                  2.4/2
   CO2 BACKGRD PERCENT                               .06
   NOX SAMPLE   METER READING/SCALE                 18.4/3
   NOX SAMPLE   PPM                                 55.2
   NOX BACKGRD METER READING/SCALE                    .3/3
   NOX BACKGRD PPM                                     .9

   HC   CONCENTRATION PPM                            744
   CO   CONCENTRATION PPM                           3922
   CO2 CONCENTRATION PCT                             .90
   NOX CONCENTRATION PPM                            54.4
   HC   MASS (GRAMS)                              161.58
   CO   MASS (GRAMS)                             1719.91
   CO2 MASS (GRAMS)                              6260.51
   NOX MASS (GRAMS)                                39.18

HC   GRAMS/MILE  22.32
CO   GRAMS/MILE  237.6
CO2 GRAMS/MILE    865
NOX GRAMS/MILE   5.41

HC   GRAMS/LB OF FUEL  23.28     HC   GRAMS/MIN   7.99
CO   GRAMS/LB OF FUEL  247.8     CO   GRAMS/MIN   85.1
CO2 GRAMS/LB OF FUEL    902     CO2 GRAMS/MIN    310
NOX GRAMS/LB OF FUEL   5.65     NOX GRAMS/MIN   1.94


TOTAL CARBON = 2586.06 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.58 LB.
```

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                        EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER G-1

DATE  7/19/74                  TIME  1200 HRS.           TEST NO.  3
MODEL  1967 FORD               BOX VAN                   ENGINE 340 CID V8
DRIVER  TLC                    TEST WT. 12400 LB.        GVW17000 LB.

WET BULB TEMP  78 F            DRY BULB TEMP  94 F       REL. HUM.  48.9 PCT
SPEC. HUM.  *9.0 GRAIN/LB  BARO.  29.60 IN. HG.     MEASURED FUEL  7.16 LB.

  RUN DURATION           20.96 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.    12.0  IN. H20
  BLOWER INLET TEMP.      125  DEG. F
  BLOWER REVOLUTIONS    24315
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                  71.9/3
   HC   SAMPLE   PPM                                   719
   HC   BACKGRD METER READING/SCALE                    1.6/3
   HC   BACKGRD PPM                                     16
   CO   SAMPLE   METER READING/SCALE                  97.9/2
   CO   SAMPLE   PPM                                  4342
   CO   BACKGRD METER READING/SCALE                     .9/2
   CO   BACKGRD PPM                                     25
   CO2 SAMPLE   METER READING/SCALE                   36.8/2
   CO2 SAMPLE   PERCENT                               1.00
   CO2 BACKGRD METER READING/SCALE                     2.2/2
   CO2 BACKGRD PERCENT                                  .05
   NOX SAMPLE   METER READING/SCALE                   57.3/2
   NOX SAMPLE   PPM                                   57.3
   NOX BACKGRD METER READING/SCALE                      .6/3
   NOX BACKGRD PPM                                     1.8

   HC   CONCENTRATION PPM                              705
   CO   CONCENTRATION PPM                             4167
   CO2 CONCENTRATION PCT                               .95
   NOX CONCENTRATION PPM                              55.7
   HC   MASS (GRAMS)                                158.60
   CO   MASS (GRAMS)                               1893.26
   CO2 MASS (GRAMS)                                6841.38
   NOX MASS (GRAMS)                                  41.57

HC   GRAMS/MILE  21.91
CO   GRAMS/MILE  261.5
CO2 GRAMS/MILE     945
NOX GRAMS/MILE    5.74

HC   GRAMS/LB OF FUEL  22.15      HC   GRAMS/MIN    7.57
CO   GRAMS/LB OF FUEL  264.4      CO   GRAMS/MIN    90.3
CO2 GRAMS/LB OF FUEL     956      CO2 GRAMS/MIN     326
NOX GRAMS/LB OF FUEL    5.81      NOX GRAMS/MIN    1.98


TOTAL CARBON = 2816.35 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.17 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER G-1

DATE  7/19/74                  TIME  1300 HRS.          TEST NO.  4
MODEL  1967 FORD               BOX VAN                  ENGINE 330 CID V8
DRIVER  ARL                    TEST WT. 12400 LB.       GVW17000 LB.

WET BULB TEMP  78 F            DRY BULB TEMP  94 F      REL. HUM.  48.9 PCT
SPEC. HUM.  *9,0 GRAIN/LB      BARO.  29,59 IN. HG.     MEASURED FUEL  7,14 LB.

  RUN DURATION            21,69 MINUTES
  BLOWER INLET PRESS.      7,5  IN. H20
  BLOWER DIF.  PRESS.     12,0  IN. H20
  BLOWER INLET TEMP.       125  DEG. F
  BLOWER REVOLUTIONS     25124
  BLOWER CU. FT./REV.     ,647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   82,0/3
   HC   SAMPLE  PPM                                    820
   HC   BACKGRD METER READING/SCALE                    1,5/3
   HC   BACKGRD PPM                                     15
   CO   SAMPLE  METER READING/SCALE                   96,4/2
   CO   SAMPLE  PPM                                   4238
   CO   BACKGRD METER READING/SCALE                    1,2/2
   CO   BACKGRD PPM                                     34
   CO2 SAMPLE   METER READING/SCALE                   35,2/2
   CO2 SAMPLE   PERCENT                                ,95
   CO2 BACKGRD METER READING/SCALE                     2,6/2
   CO2 BACKGRD PERCENT                                 ,06
   NOX SAMPLE   METER READING/SCALE                   57,1/2
   NOX SAMPLE   PPM                                   57,1
   NOX BACKGRD METER READING/SCALE                     ,9/3
   NOX BACKGRD PPM                                     2,7

   HC   CONCENTRATION PPM                              807
   CO   CONCENTRATION PPM                             4063
   CO2 CONCENTRATION PCT                               ,90
   NOX CONCENTRATION PPM                              54,7
   HC   MASS (GRAMS)                                187,47
   CO   MASS (GRAMS)                               1906,55
   CO2 MASS (GRAMS)                                6644,93
   NOX MASS (GRAMS)                                  42,16

HC   GRAMS/MILE   25,89
CO   GRAMS/MILE   263,3
CO2 GRAMS/MILE      918
NOX GRAMS/MILE     5,82

HC   GRAMS/LB OF FUEL  26,26     HC   GRAMS/MIN    8,64
CO   GRAMS/LB OF FUEL  267,0     CO   GRAMS/MIN    87,9
CO2 GRAMS/LB OF FUEL     931     CO2 GRAMS/MIN     306
NOX GRAMS/LB OF FUEL    5,90     NOX GRAMS/MIN    1,94


TOTAL CARBON = 2793,43 GRAMS
CARBON BALANCE FUEL WEIGHT =  7,11 LB.
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                  EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER G-1

DATE   7/19/74                TIME   1330 HRS.             TEST NO.  5
MODEL  1967 FORD               BOX VAN                     ENGINE 330 CID V8
DRIVER  ARL                   TEST WT. 12400 LB.           GVW17000 LB.

WET BULB TEMP  78 F           DRY BULB TEMP  95 F          REL. HUM.  46.8 PCT
SPEC. HUM.  *7.2 GRAIN/LB     BARO.  29.60 IN. HG.         MEASURED FUEL  6.94 LB.

  RUN DURATION              19.39 MINUTES
  BLOWER INLET PRESS.    7.5   IN. H20
  BLOWER DIF.  PRESS.   12.0   IN. H20
  BLOWER INLET TEMP.     130   DEG. F
  BLOWER REVOLUTIONS   22564
  BLOWER CU. FT./REV.   .645

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                         87.5/3
   HC   SAMPLE   PPM                                          875
   HC   BACKGRD  METER READING/SCALE                          2.8/3
   HC   BACKGRD  PPM                                          28
   CO   SAMPLE   METER READING/SCALE                         41.3/1
   CO   SAMPLE   PPM                                         3615
   CO   BACKGRD  METER READING/SCALE                          1.6/2
   CO   BACKGRD  PPM                                          45
   CO2  SAMPLE   METER READING/SCALE                         37.9/2
   CO2  SAMPLE   PERCENT                                     1.04
   CO2  BACKGRD  METER READING/SCALE                          2.6/2
   CO2  BACKGRD  PERCENT                                      .06
   NOX  SAMPLE   METER READING/SCALE                         66.2/2
   NOX  SAMPLE   PPM                                         66.2
   NOX  BACKGRD  METER READING/SCALE                           .6/3
   NOX  BACKGRD  PPM                                          1.8

   HC   CONCENTRATION PPM                                     850
   CO   CONCENTRATION PPM                                    3448
   CO2  CONCENTRATION PCT                                     .98
   NOX  CONCENTRATION PPM                                    64.6
   HC   MASS (GRAMS)                                       175.56
   CO   MASS (GRAMS)                                      1437.89
   CO2  MASS (GRAMS)                                      6436.01
   NOX  MASS (GRAMS)                                        44.25

HC   GRAMS/MILE   24.25
CO   GRAMS/MILE   198.6
CO2  GRAMS/MILE     889
NOX  GRAMS/MILE    6.11

HC   GRAMS/LB OF FUEL  25.30       HC   GRAMS/MIN    9.05
CO   GRAMS/LB OF FUEL  207.2       CO   GRAMS/MIN    74.2
CO2  GRAMS/LB OF FUEL    927       CO2  GRAMS/MIN     332
NOX  GRAMS/LB OF FUEL   6.38       NOX  GRAMS/MIN    2.28


TOTAL CARBON = 2525.17 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.43 LB.
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                        EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                    TRUCK NUMBER G-1

DATE  7/19/74                 TIME  1400 HRS.          TEST NO.  6
MODEL  1967 FORD              BOX VAN                  ENGINE 330 CID V8
DRIVER  ARL                   TEST WT. 12400 LB.       GVW17000 LB.

WET BULB TEMP  80 F           DRY BULB TEMP  97 F      REL. HUM.  47.7 PCT
SPEC. HUM.  *7.4 GRAIN/LB  BARO.  29.60 IN. HG.     MEASURED FUEL  7.22 LB.

  RUN DURATION          21.87 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H20
  BLOWER DIF.  PRESS.   12.0  IN. H20
  BLOWER INLET TEMP.     125  DEG. F
  BLOWER REVOLUTIONS  25318
  BLOWER CU. FT./REV.  .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              77.6/3
   HC   SAMPLE  PPM                               776
   HC   BACKGRD METER READING/SCALE               1.9/3
   HC   BACKGRD PPM                                19
   CO   SAMPLE  METER READING/SCALE              95.3/2
   CO   SAMPLE  PPM                              4163
   CO   BACKGRD METER READING/SCALE               1.3/2
   CO   BACKGRD PPM                                37
   CO2  SAMPLE  METER READING/SCALE              35.4/2
   CO2  SAMPLE  PERCENT                           .96
   CO2  BACKGRD METER READING/SCALE               3.1/2
   CO2  BACKGRD PERCENT                           .08
   NOX  SAMPLE  METER READING/SCALE              58.6/2
   NOX  SAMPLE  PPM                              58.6
   NOX  BACKGRD METER READING/SCALE               1.2/3
   NOX  BACKGRD PPM                               3.6

   HC   CONCENTRATION PPM                         759
   CO   CONCENTRATION PPM                        3989
   CO2  CONCENTRATION PCT                         .89
   NOX  CONCENTRATION PPM                        55.4
   HC   MASS (GRAMS)                           177.83
   CO   MASS (GRAMS)                          1886.94
   CO2  MASS (GRAMS)                          6658.43
   NOX  MASS (GRAMS)                            43.04

HC   GRAMS/MILE  24.56
CO   GRAMS/MILE  260.6
CO2  GRAMS/MILE    920
NOX  GRAMS/MILE   5.94

HC   GRAMS/LB OF FUEL  24.63      HC   GRAMS/MIN   8.13
CO   GRAMS/LB OF FUEL  261.3      CO   GRAMS/MIN   86.3
CO2  GRAMS/LB OF FUEL    922      CO2  GRAMS/MIN    304
NOX  GRAMS/LB OF FUEL   5.96      NOX  GRAMS/MIN   1.97


TOTAL CARBON = 2780.36 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.08 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                            TRUCK NUMBER G-1

DATE  7/19/74               TIME  1430 HRS.          TEST NO.  7
MODEL  1967 FORD            BOX VAN                  ENGINE 330 CID V8
DRIVER  RKH                 TEST WT. 12400 LB.       GVW17000 LB.

WET BULB TEMP  84 F         DRY BULB TEMP  98 F      REL. HUM.  56.0 PCT
SPEC. HUM.  *5.1 GRAIN/LB   BARO.  29.58 IN. HG.     MEASURED FUEL  7.15 LB.

  RUN DURATION          19.77 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   12.0  IN. H2O
  BLOWER INLET TEMP.     117  DEG. F
  BLOWER REVOLUTIONS  22882
  BLOWER CU. FT./REV.  .649

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 79.6/3
   HC   SAMPLE  PPM                                 796
   HC   BACKGRD METER READING/SCALE                  2.2/3
   HC   BACKGRD PPM                                  22
   CO   SAMPLE  METER READING/SCALE                 41.2/1
   CO   SAMPLE  PPM                                 3602
   CO   BACKGRD METER READING/SCALE                  1.3/2
   CO   BACKGRD PPM                                  37
   CO2  SAMPLE  METER READING/SCALE                 37.3/2
   CO2  SAMPLE  PERCENT                             1.02
   CO2  BACKGRD METER READING/SCALE                  2.5/2
   CO2  BACKGRD PERCENT                              .06
   NOX  SAMPLE  METER READING/SCALE                 65.5/2
   NOX  SAMPLE  PPM                                 65.5
   NOX  BACKGRD METER READING/SCALE                  .8/3
   NOX  BACKGRD PPM                                  2.4

   HC   CONCENTRATION PPM                            776
   CO   CONCENTRATION PPM                           3434
   CO2  CONCENTRATION PCT                            .96
   NOX  CONCENTRATION PPM                           63.4
   HC   MASS (GRAMS)                              167.02
   CO   MASS (GRAMS)                             1491.52
   CO2  MASS (GRAMS)                             6595.24
   NOX  MASS (GRAMS)                               45.21

HC   GRAMS/MILE  23.07
CO   GRAMS/MILE  206.0
CO2  GRAMS/MILE    911
NOX  GRAMS/MILE   6.24

HC   GRAMS/LB OF FUEL  23.36     HC   GRAMS/MIN   8.45
CO   GRAMS/LB OF FUEL  208.6     CO   GRAMS/MIN   75.4
CO2  GRAMS/LB OF FUEL    922     CO2  GRAMS/MIN    334
NOX  GRAMS/LB OF FUEL   6.32     NOX  GRAMS/MIN   2.29


TOTAL CARBON = 2584.19 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.58 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER G-1

DATE  7/19/74                  TIME  1530 HRS.          TEST NO.  9
MUDEL  1967  FORD                BOX VAN                ENGINE 330 CID V8
DRIVER  RKH                    TEST WT. 12400 LB.       GVW17000 LB.

WET BULH TEMP  74 F            DRY BULB TEMP 102 F      REL. HUM.  36.2 PCT
SPEC. HUM.  42.1 GRAIN/LB  BARO.  29.55 IN. HG.    MEASURED FUEL  6.69 LB.

  RUN DURATION           21.66 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  12.0  IN. H2O
  BLOWER INLET TEMP.    125  DEG. F
  BLOWER REVOLUTIONS  25090
  BLOWER CU. FT./REV.  .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 80.4/3
   HC   SAMPLE  PPM                                  804
   HC   BACKGRD METER READING/SCALE                  2.4/3
   HC   BACKGRD PPM                                   24
   CO   SAMPLE  METER READING/SCALE                 94.5/2
   CO   SAMPLE  PPM                                 4109
   CO   BACKGRD METER READING/SCALE                  1.1/2
   CO   BACKGRD PPM                                   31
   CO2 SAMPLE  METER READING/SCALE                  53.2/3
   CO2 SAMPLE  PERCENT                               .87
   CO2 HACKGRD METER READING/SCALE                   3.8/2
   CO2 BACKGRD PERCENT                               .10
   NOX SAMPLE  METER READING/SCALE                  18.6/3
   NOX SAMPLE  PPM                                  55.8
   NOX BACKGRD METER READING/SCALE                   .8/3
   NOX BACKGRD PPM                                   2.4

   HC   CONCENTRATION PPM                           782
   CO   CONCENTRATION PPM                          3965
   CO2 CONCENTRATION PCT                            .78
   NOX CONCENTRATION PPM                           53.6
   HC   MASS (GRAMS)                             181.34
   CO   MASS (GRAMS)                            1855.15
   CO2 MASS (GRAMS)                             5767.92
   NOX MASS (GRAMS)                               41.23

HC   GRAMS/MILE  25.05
CO   GRAMS/MILE  256.2
CO2 GRAMS/MILE    797
NOX GRAMS/MILE   5.70

HC   GRAMS/LB OF FUEL  27.11      HC   GRAMS/MIN    8.37
CO   GRAMS/LB OF FUEL  277.3      CO   GRAMS/MIN   85.6
CO2 GRAMS/LB OF FUEL    862      CO2 GRAMS/MIN    266
NOX GRAMS/LH OF FUEL   6.16      NOX GRAMS/MIN   1.90


TOTAL CARBON = 2526.72 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.43 LB.
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TRUCK G-2

1968 IHC 18200 LB GVW VAN
WITH 304 CID V8 ENGINE
(8 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G2

DATE  8/ 1/74                TIME  1000 HRS.          TEST NO.  1
MODEL  1968 INTERNATIONAL   BOX VAN                  ENGINE 304 CID V8
DRIVER  EMK                  TEST WT. 14885 LB.       GVW18200 LB.

WET BULB TEMP  74 F          DRY BULB TEMP  83 F      REL. HUM.  65.7 PCT
SPEC. HUM.  *4.2 GRAIN/LB   BARO.  29.21 IN. HG.     MEASURED FUEL  7.76 LB.

  RUN DURATION           20.87 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      110  DEG. F
  BLOWER REVOLUTIONS   24216
  BLOWER CU. FT./REV.   .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              10.1/4
   HC  SAMPLE  PPM                              1010
   HC  BACKGRD METER READING/SCALE               2.2/3
   HC  BACKGRD PPM                                22
   CO  SAMPLE  METER READING/SCALE              96.3/2
   CO  SAMPLE  PPM                              4231
   CO  BACKGRD METER READING/SCALE               1.9/2
   CO  BACKGRD PPM                                54
   CO2 SAMPLE  METER READING/SCALE              60.3/3
   CO2 SAMPLE  PERCENT                          1.00
   CO2 BACKGRD METER READING/SCALE               4.2/3
   CO2 BACKGRD PERCENT                           .06
   NOX SAMPLE  METER READING/SCALE              55.7/2
   NOX SAMPLE  PPM                              55.7
   NOX BACKGRD METER READING/SCALE               2.2/2
   NOX BACKGRD PPM                               2.2

   HC  CONCENTRATION PPM                         990
   CO  CONCENTRATION PPM                        4013
   CO2 CONCENTRATION PCT                         .95
   NOX CONCENTRATION PPM                        53.7
   HC  MASS (GRAMS)                           224.77
   CO  MASS (GRAMS)                          1838.59
   CO2 MASS (GRAMS)                          6846.97
   NOX MASS (GRAMS)                            40.45

HC  GRAMS/MILE  29.77
CO  GRAMS/MILE  243.5
CO2 GRAMS/MILE    907
NOX GRAMS/MILE   5.36

HC  GRAMS/LB OF FUEL  28.97     HC  GRAMS/MIN  10.77
CO  GRAMS/LB OF FUEL  236.9     CO  GRAMS/MIN   88.1
CO2 GRAMS/LB OF FUEL    882     CO2 GRAMS/MIN    328
NOX GRAMS/LB OF FUEL   5.21     NOX GRAMS/MIN   1.94


TOTAL CARBON = 2851.73 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.26 LB.
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                     EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G2

DATE  8/ 1/74                  TIME  1030 HRS.         TEST NO.  2
MODEL  1968 INTERNATIONAL      BOX VAN                 ENGINE 304 CID V8
DRIVER  EMK                    TEST WT. 14885 LB.      GVW18200 LB.

WET BULB TEMP  75 F            DRY BULB TEMP  85 F     REL. HUM.  63.0 PCT
SPEC. HUM.  *7.0 GRAIN/LB      BARO.  29.21 IN. HG.    MEASURED FUEL  7.07 LB.

  RUN DURATION          20.30 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H20
  BLOWER DIF.  PRESS.   13.0  IN. H20
  BLOWER INLET TEMP.     120  DEG. F
  BLOWER REVOLUTIONS   23554
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             84.6/3
   HC   SAMPLE  PPM                              846
   HC   BACKGRD METER READING/SCALE              2.2/3
   HC   BACKGRD PPM                               22
   CO   SAMPLE  METER READING/SCALE             93.4/2
   CO   SAMPLE  PPM                             4035
   CO   BACKGRD METER READING/SCALE              2.3/2
   CO   BACKGRD PPM                               65
   CO2  SAMPLE  METER READING/SCALE             59.3/3
   CO2  SAMPLE  PERCENT                          .98
   CO2  BACKGRD METER READING/SCALE              3.9/3
   CO2  BACKGRD PERCENT                          .06
   NOX  SAMPLE  METER READING/SCALE             54.2/2
   NOX  SAMPLE  PPM                             54.2
   NOX  BACKGRD METER READING/SCALE              2.6/2
   NOX  BACKGRD PPM                              2.6

   HC   CONCENTRATION PPM                        826
   CO   CONCENTRATION PPM                       3820
   CO2  CONCENTRATION PCT                        .93
   NOX  CONCENTRATION PPM                       51.9
   HC   MASS (GRAMS)                          178.94
   CO   MASS (GRAMS)                         1669.98
   CO2  MASS (GRAMS)                         6426.03
   NOX  MASS (GRAMS)                           37.26

HC   GRAMS/MILE  23.70
CO   GRAMS/MILE  221.2
CO2  GRAMS/MILE    851
NOX  GRAMS/MILE   4.93

HC   GRAMS/LB OF FUEL  25.31     HC   GRAMS/MIN   8.81
CO   GRAMS/LB OF FUEL  236.2     CO   GRAMS/MIN   82.3
CO2  GRAMS/LB OF FUEL    909     CO2  GRAMS/MIN    317
NOX  GRAMS/LB OF FUEL   5.27     NOX  GRAMS/MIN   1.84


TOTAL CARBON = 2624.86 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.68 LB.
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                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G2

DATE  8/ 1/74                 TIME  1130 HRS.         TEST NO.  4
MODEL  1968 INTERNATIONAL     BOX VAN                 ENGINE 304 CID V8
DRIVER  RKH                   TEST WT. 14885 LB.      GVW18200 LB.

WET BULB TEMP  75 F           DRY BULB TEMP  87 F     REL. HUM.  57.4 PCT
SPEC. HUM.  *3.5 GRAIN/LB     BARO.  29.21 IN. HG.    MEASURED FUEL  7.00 LB.

  RUN DURATION            25.38 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       114  DEG. F
  BLOWER REVOLUTIONS     29417
  BLOWER CU. FT./REV.     .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  64.1/3
   HC  SAMPLE  PPM                                   641
   HC  BACKGRD METER READING/SCALE                   2.2/3
   HC  BACKGRD PPM                                    22
   CO  SAMPLE  METER READING/SCALE                  81.2/2
   CO  SAMPLE  PPM                                  3279
   CO  BACKGRD METER READING/SCALE                   1.8/2
   CO  BACKGRD PPM                                    51
   CO2 SAMPLE  METER READING/SCALE                  49.8/3
   CO2 SAMPLE  PERCENT                               .80
   CO2 BACKGRD METER READING/SCALE                   4.4/3
   CO2 BACKGRD PERCENT                               .06
   NOX SAMPLE  METER READING/SCALE                  40.7/2
   NOX SAMPLE  PPM                                  40.7
   NOX BACKGRD METER READING/SCALE                   1.5/2
   NOX BACKGRD PPM                                   1.5

   HC  CONCENTRATION PPM                             621
   CO  CONCENTRATION PPM                            3122
   CO2 CONCENTRATION PCT                             .75
   NOX CONCENTRATION PPM                            39.3
   HC  MASS (GRAMS)                               169.92
   CO  MASS (GRAMS)                              1724.93
   CO2 MASS (GRAMS)                              6506.93
   NOX MASS (GRAMS)                                35.70

HC  GRAMS/MILE  22.51
CO  GRAMS/MILE  228.5
CO2 GRAMS/MILE    862
NOX GRAMS/MILE   4.73

HC  GRAMS/LB OF FUEL  24.27     HC  GRAMS/MIN   6.69
CO  GRAMS/LB OF FUEL  246.4     CO  GRAMS/MIN   68.0
CO2 GRAMS/LB OF FUEL    930     CO2 GRAMS/MIN    256
NOX GRAMS/LB OF FUEL   5.10     NOX GRAMS/MIN   1.41


TOTAL CARBON = 2662.69 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.78 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G2

DATE  8/ 1/74                     TIME  1200 HRS.           TEST NO.  5
MODEL  1968 INTERNATIONAL         BOX VAN                   ENGINE 304 CID V8
DRIVER  RKH                       TEST WT. 14885 LB.        GVW18200 LB.

WET BULB TEMP  76 F               DRY BULB TEMP  93 F       REL. HUM.  46.0 PCT
SPEC. HUM.  *9.8 GRAIN/LB         BARO.  29.15 IN. HG.      MEASURED FUEL  7.12 LB.

  RUN DURATION            20.96 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H20
  BLOWER DIF.  PRESS.     13.0  IN. H20
  BLOWER INLET TEMP.       121  DEG. F
  BLOWER REVOLUTIONS     24306
  BLOWER CU. FT./REV.     .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                      64.3/3
   HC   SAMPLE  PPM                                       643
   HC   BACKGRD METER READING/SCALE                       1.8/3
   HC   BACKGRD PPM                                        18
   CO   SAMPLE  METER READING/SCALE                      90.1/2
   CO   SAMPLE  PPM                                      3821
   CO   BACKGRD METER READING/SCALE                       1.7/2
   CO   BACKGRD PPM                                        48
   CO2  SAMPLE  METER READING/SCALE                      57.1/3
   CO2  SAMPLE  PERCENT                                    .94
   CO2  BACKGRD METER READING/SCALE                       4.0/3
   CO2  BACKGRD PERCENT                                    .06
   NOX  SAMPLE  METER READING/SCALE                      51.7/2
   NOX  SAMPLE  PPM                                      51.7
   NOX  BACKGRD METER READING/SCALE                       1.4/2
   NOX  BACKGRD PPM                                       1.4

   HC   CONCENTRATION PPM                                 627
   CO   CONCENTRATION PPM                                3652
   CO2  CONCENTRATION PCT                                 .89
   NOX  CONCENTRATION PPM                                50.4
   HC   MASS (GRAMS)                                   139.46
   CO   MASS (GRAMS)                                  1640.54
   CO2  MASS (GRAMS)                                  6294.30
   NOX  MASS (GRAMS)                                    37.22

HC   GRAMS/MILE   18.47
CO   GRAMS/MILE   217.3
CO2  GRAMS/MILE     834
NOX  GRAMS/MILE    4.44

HC   GRAMS/LB OF FUEL  19.59      HC   GRAMS/MIN   6.65
CO   GRAMS/LB OF FUEL  230.4      CO   GRAMS/MIN   78.3
CO2  GRAMS/LB OF FUEL    884      CO2  GRAMS/MIN    300
NOX  GRAMS/LB OF FUEL   5.23      NOX  GRAMS/MIN   1.78


TOTAL CARBON = 2542.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.47 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G2

DATE  8/ 1/74                TIME  1300 HRS.          TEST NO.  6
MODEL  1969 INTERNATIONAL    BOX VAN                  ENGINE 304 CID V8
DRIVER  RKM                  TEST WT. 14885 LB.       GVW18200 LB.

WET BULB TEMP  76 F          DRY BULB TEMP  93 F      REL. HUM.  46.0 PCT
SPEC. HUM.  *9.8 GRAIN/LB    BARO.  29.15 IN. HG.     MEASURED FUEL  7.56 LB.

  RUN DURATION           22.78 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS    26416
  BLOWER CU. FT./REV.    .642

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                67.9/3
   HC   SAMPLE  PPM                                679
   HC   BACKGRD METER READING/SCALE                 1.8/3
   HC   BACKGRD PPM                                  18
   CO   SAMPLE  METER READING/SCALE                93.8/2
   CO   SAMPLE  PPM                                4062
   CO   BACKGRD METER READING/SCALE                 2.5/2
   CO   BACKGRD PPM                                  71
   CO2  SAMPLE  METER READING/SCALE                59.8/3
   CO2  SAMPLE  PERCENT                             .99
   CO2  BACKGRD METER READING/SCALE                 4.3/3
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                57.5/2
   NOX  SAMPLE  PPM                                57.5
   NOX  BACKGRD METER READING/SCALE                 1.1/2
   NOX  BACKGRD PPM                                 1.1

   HC   CONCENTRATION PPM                          663
   CO   CONCENTRATION PPM                         3862
   CO2  CONCENTRATION PCT                          .94
   NOX  CONCENTRATION PPM                         56.5
   HC   MASS (GRAMS)                            157.13
   CO   MASS (GRAMS)                           1847.92
   CO2  MASS (GRAMS)                           7066.75
   NOX  MASS (GRAMS)                             44.43

HC   GRAMS/MILE  20.81
CO   GRAMS/MILE  244.8
CO2  GRAMS/MILE    936
NOX  GRAMS/MILE   5.88

HC   GRAMS/LB OF FUEL  20.78      HC   GRAMS/MIN   6.90
CO   GRAMS/LB OF FUEL  244.4      CO   GRAMS/MIN   81.1
CO2  GRAMS/LB OF FUEL    935      CO2  GRAMS/MIN    310
NOX  GRAMS/LB OF FUEL   5.88      NOX  GRAMS/MIN   1.95


TOTAL CARBON = 2857.14 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.27 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G2

DATE  8/ 1/74                TIME  1330 HRS.          TEST NO.  7
MODEL  1968 INTERNATIONAL  BOX VAN                    ENGINE 304 CID V8
DRIVER  TLC                  TEST WT. 14885 LB.       GVW18200 LB.

WET BULB TEMP  74 F          DRY BULB TEMP  93 F      REL. HUM.  40.8 PCT
SPEC. HUM.  97.3 GRAIN/LB  BARO.  29.15 IN. HG.     MEASURED FUEL  7.15 LB.

  RUN DURATION          23.76 MINUTES
  BLOWER INLET PRESS.    7.0  IN. H2O
  BLOWER DIF.  PRESS.   12.5  IN. H2O
  BLOWER INLET TEMP.     120  DEG. F
  BLOWER REVOLUTIONS  27558
  BLOWER CU. FT./REV.  .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  55.4/3
   HC  SAMPLE  PPM                                   554
   HC  BACKGRD METER READING/SCALE                   1.8/3
   HC  BACKGRD PPM                                    18
   CO  SAMPLE  METER READING/SCALE                  81.4/2
   CO  SAMPLE  PPM                                  3291
   CO  BACKGRD METER READING/SCALE                   2.0/2
   CO  BACKGRD PPM                                    57
   CO2 SAMPLE  METER READING/SCALE                  55.3/3
   CO2 SAMPLE  PERCENT                               .91
   CO2 BACKGRD METER READING/SCALE                   3.9/3
   CO2 BACKGRD PERCENT                               .06
   NOX SAMPLE  METER READING/SCALE                  62.0/2
   NOX SAMPLE  PPM                                  62.0
   NOX BACKGRD METER READING/SCALE                   1.1/2
   NOX BACKGRD PPM                                   1.1

   HC  CONCENTRATION PPM                             538
   CO  CONCENTRATION PPM                            3139
   CO2 CONCENTRATION PCT                             .85
   NOX CONCENTRATION PPM                            61.0
   HC  MASS (GRAMS)                               136.33
   CO  MASS (GRAMS)                              1607.07
   CO2 MASS (GRAMS)                              6906.46
   NOX MASS (GRAMS)                                51.30

HC  GRAMS/MILE  18.06
CO  GRAMS/MILE  212.9
CO2 GRAMS/MILE    915
NOX GRAMS/MILE   6.79

HC  GRAMS/LB OF FUEL  19.07     HC  GRAMS/MIN   5.74
CO  GRAMS/LB OF FUEL  224.8     CO  GRAMS/MIN   67.6
CO2 GRAMS/LB OF FUEL    966     CO2 GRAMS/MIN    291
NOX GRAMS/LB OF FUEL   7.17     NOX GRAMS/MIN   2.16


TOTAL CARBON = 2642.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.85 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G2

DATE  8/ 1/74                   TIME  1400 HRS.          TEST NO.  8
MODEL  1968 INTERNATIONAL  BOX VAN                  ENGINE 304 CID V8
DRIVER  TLC                     TEST WT. 14885 LB.       GVW18200 LB.

WET BULB TEMP  73 F             DRY BULB TEMP  97 F      REL. HUM.  31.4 PCT
SPEC. HUM.  84.2 GRAIN/LB  BARO.  29.21 IN. HG.     MEASURED FUEL  6.83 LB.

  RUN DURATION           21.82 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    12.5  IN. H2O
  BLOWER INLET TEMP.      125  DEG. F
  BLOWER REVOLUTIONS    25287
  BLOWER CU. FT./REV.    .645

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              62.3/3
   HC  SAMPLE  PPM                              623
   HC  BACKGRD METER READING/SCALE               1.4/3
   HC  BACKGRD PPM                               14
   CO  SAMPLE  METER READING/SCALE              87.6/2
   CO  SAMPLE  PPM                              3663
   CO  BACKGRD METER READING/SCALE               2.1/2
   CO  BACKGRD PPM                               60
   CO2 SAMPLE  METER READING/SCALE              56.5/3
   CO2 SAMPLE  PERCENT                           .93
   CO2 BACKGRD METER READING/SCALE               3.8/3
   CO2 BACKGRD PERCENT                           .05
   NOX SAMPLE  METER READING/SCALE              54.3/2
   NOX SAMPLE  PPM                              54.3
   NOX BACKGRD METER READING/SCALE               .6/2
   NOX BACKGRD PPM                               .6

   HC  CONCENTRATION PPM                        610
   CO  CONCENTRATION PPM                        3508
   CO2 CONCENTRATION PCT                         .88
   NOX CONCENTRATION PPM                        53.8
   HC  MASS (GRAMS)                            140.80
   CO  MASS (GRAMS)                           1633.45
   CO2 MASS (GRAMS)                           6460.73
   NOX MASS (GRAMS)                             41.13

HC  GRAMS/MILE  18.65
CO  GRAMS/MILE  216.4
CO2 GRAMS/MILE    856
NOX GRAMS/MILE   5.45

HC  GRAMS/LB OF FUEL  20.61     HC  GRAMS/MIN   6.45
CO  GRAMS/LB OF FUEL  239.2     CO  GRAMS/MIN   74.9
CO2 GRAMS/LB OF FUEL    946     CO2 GRAMS/MIN    296
NOX GRAMS/LB OF FUEL   6.02     NOX GRAMS/MIN   1.88


TOTAL CARBON = 2585.63 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.58 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G2

DATE  8/ 1/74                  TIME  1500 HRS.          TEST NO.  9
MODEL  1968 INTERNATIONAL  BOX VAN                  ENGINE 304 CID V8
DRIVER  TLC                    TEST WT. 14885 LB.      GVW18200 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  97 F      REL. HUM.  40.5 PCT
SPEC. HUM.  *9.1 GRAIN/LB  BARO.  29.21 IN. HG.   MEASURED FUEL  6.77 LB.

  RUN DURATION            21.69 MINUTES
  BLOWER INLET PRESS.   7.0  IN. H2O
  BLOWER DIF.  PRESS.  12.5  IN. H2O
  BLOWER INLET TEMP.    130  DEG. F
  BLOWER REVOLUTIONS  25137
  BLOWER CU. FT./REV.  .643

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              60.2/3
   HC  SAMPLE  PPM                               602
   HC  BACKGRD METER READING/SCALE               1.7/3
   HC  BACKGRD PPM                                17
   CO  SAMPLE  METER READING/SCALE              84.4/2
   CO  SAMPLE  PPM                              3468
   CO  BACKGRD METER READING/SCALE               2.0/2
   CO  BACKGRD PPM                                57
   CO2 SAMPLE  METER READING/SCALE              58.2/3
   CO2 SAMPLE  PERCENT                           .96
   CO2 BACKGRD METER READING/SCALE               4.5/3
   CO2 BACKGRD PERCENT                           .07
   NOX SAMPLE  METER READING/SCALE              62.9/2
   NOX SAMPLE  PPM                              62.9
   NOX BACKGRD METER READING/SCALE                .5/2
   NOX BACKGRD PPM                                .5

   HC  CONCENTRATION PPM                         587
   CO  CONCENTRATION PPM                        3308
   CO2 CONCENTRATION PCT                         .90
   NOX CONCENTRATION PPM                        62.5
   HC  MASS (GRAMS)                           133.01
   CO  MASS (GRAMS)                          1514.10
   CO2 MASS (GRAMS)                          6516.19
   NOX MASS (GRAMS)                            46.95

HC  GRAMS/MILE  17.62
CO  GRAMS/MILE  200.5
CO2 GRAMS/MILE    863
NOX GRAMS/MILE   6.22

HC  GRAMS/LB OF FUEL  19.65      HC  GRAMS/MIN   6.13
CO  GRAMS/LB OF FUEL  223.6      CO  GRAMS/MIN   69.8
CO2 GRAMS/LB OF FUEL    963      CO2 GRAMS/MIN    300
NOX GRAMS/LB OF FUEL   6.94      NOX GRAMS/MIN   2.16


TOTAL CARBON = 2542.84 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.47 LB.
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TRUCK G-3

1967 FORD 10000 LB GVW VAN
WITH 300 CID I6 ENGINE
(8 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G3

DATE  8/12/74                 TIME  1000 HRS.          TEST NO.  1
MODEL  1967 FORD              BOX VAN                  ENGINE 300 CID I6
DRIVER  EMK                   TEST WT.  9140 LB.       GVW10000 LB.

WET BULB TEMP  77 F           DRY BULB TEMP  82 F      REL. HUM.  74.8 PCT
SPEC. HUM.  *3.6 GRAIN/LB     BARO.  29.52 IN. HG.     MEASURED FUEL  6.22 LB.

  RUN DURATION             20.03 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  13.5  IN. H2O
  BLOWER INLET TEMP.    125  DEG. F
  BLOWER REVOLUTIONS  23205
  BLOWER CU. FT./REV.  .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               37.0/3
   HC   SAMPLE  PPM                                370
   HC   BACKGRD METER READING/SCALE                1.1/3
   HC   BACKGRD PPM                                 11
   CO   SAMPLE  METER READING/SCALE               86.9/2
   CO   SAMPLE  PPM                               3620
   CO   BACKGRD METER READING/SCALE                2.3/2
   CO   BACKGRD PPM                                 65
   CO2  SAMPLE  METER READING/SCALE               34.3/2
   CO2  SAMPLE  PERCENT                            .93
   CO2  BACKGRD METER READING/SCALE                2.5/2
   CO2  BACKGRD PERCENT                            .06
   NOX  SAMPLE  METER READING/SCALE               81.9/2
   NOX  SAMPLE  PPM                               81.9
   NOX  BACKGRD METER READING/SCALE                 .2/3
   NOX  BACKGRD PPM                                 .6

   HC   CONCENTRATION PPM                         360
   CO   CONCENTRATION PPM                        3404
   CO2  CONCENTRATION PCT                         .87
   NOX  CONCENTRATION PPM                        81.4
   HC   MASS (GRAMS)                            76.72
   CO   MASS (GRAMS)                          1464.45
   CO2  MASS (GRAMS)                          5921.73
   NOX  MASS (GRAMS)                            57.49

HC   GRAMS/MILE  10.60
CO   GRAMS/MILE  202.3
CO2  GRAMS/MILE    818
NOX  GRAMS/MILE   7.94

HC   GRAMS/LB OF FUEL  12.33      HC   GRAMS/MIN   3.83
CO   GRAMS/LB OF FUEL  235.4      CO   GRAMS/MIN   73.1
CO2  GRAMS/LB OF FUEL    952      CO2  GRAMS/MIN    296
NOX  GRAMS/LB OF FUEL   9.24      NOX  GRAMS/MIN   2.87


TOTAL CARBON = 2310.57 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.88 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  63

DATE  8/12/74                   TIME  1030 HRS.         TEST NO.  2
MODEL  1967  FORD                BOX VAN                ENGINE 300 CID I6
DRIVER  EMK                     TEST WT.  9140 LB.      GVW10000 LB.

WET BULB TEMP  79 F             DRY BULB TEMP  91 F     REL. HUM.  59.0 PCT
SPEC. HUM.  *1.3 GRAIN/LB  BARO.  29.52 IN. HG.         MEASURED FUEL  5.85 LB.

  RUN DURATION           19.48 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H20
  BLOWER DIF.  PRESS.   13.5  IN. H20
  BLOWER INLET TEMP.     115  DEG. F
  BLOWER REVOLUTIONS   22572
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                39.7/3
   HC   SAMPLE  PPM                                 397
   HC   BACKGRD METER READING/SCALE                 1.6/3
   HC   BACKGRD PPM                                  16
   CO   SAMPLE  METER READING/SCALE                86.4/2
   CO   SAMPLE  PPM                                3539
   CO   BACKGRD METER READING/SCALE                 2.5/2
   CO   BACKGRD PPM                                  71
   CO2  SAMPLE  METER READING/SCALE                33.5/2
   CO2  SAMPLE  PERCENT                             .90
   CO2  BACKGRD METER READING/SCALE                 2.5/2
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                70.4/2
   NOX  SAMPLE  PPM                                70.4
   NOX  BACKGRD METER READING/SCALE                  .1/3
   NOX  BACKGRD PPM                                  .3

   HC   CONCENTRATION PPM                           383
   CO   CONCENTRATION PPM                          3395
   CO2  CONCENTRATION PCT                           .85
   NOX  CONCENTRATION PPM                          70.1
   HC   MASS (GRAMS)                              80.95
   CO   MASS (GRAMS)                            1450.56
   CO2  MASS (GRAMS)                            5721.91
   NOX  MASS (GRAMS)                              49.22

HC  GRAMS/MILE   11.18
CO  GRAMS/MILE   200.4
CO2 GRAMS/MILE     790
NOX GRAMS/MILE    6.80

HC  GRAMS/LB OF FUEL  13.84      HC  GRAMS/MIN   4.16
CO  GRAMS/LB OF FUEL  248.0      CO  GRAMS/MIN   74.5
CO2 GRAMS/LB OF FUEL    978      CO2 GRAMS/MIN    294
NOX GRAMS/LB OF FUEL   8.41      NOX GRAMS/MIN   2.53


TOTAL CARBON = 2253.74 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.74 LB.
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                   EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER  G3

DATE  8/12/74                TIME  1115 HRS.          TEST NO.  3
MODEL  1967   FORD            BOX VAN                 ENGINE 300 CID I6
DRIVER  EMK                  TEST WT.  9140 LB.       GVW10000 LB.

WET BULB TEMP  79 F          DRY BULB TEMP  92 F      REL. HUM.  56.4 PCT
SPEC. HUM.  *9.6 GRAIN/LB    BARO.  29.52 IN. HG.     MEASURED FUEL  6.51 LB.

  RUN DURATION            22.62 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.5  IN. H2O
  BLOWER INLET TEMP.       120  DEG. F
  BLOWER REVOLUTIONS     26110
  BLOWER CU. FT./REV.     .645

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 37.0/3
   HC  SAMPLE  PPM                                  370
   HC  BACKGRD METER READING/SCALE                  1.6/3
   HC  BACKGRD PPM                                   16
   CO  SAMPLE  METER READING/SCALE                 84.4/2
   CO  SAMPLE  PPM                                 3468
   CO  BACKGRD METER READING/SCALE                  2.3/2
   CO  BACKGRD PPM                                   65
   CO2 SAMPLE  METER READING/SCALE                 30.6/2
   CO2 SAMPLE  PERCENT                              .82
   CO2 BACKGRD METER READING/SCALE                  2.0/2
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                 66.1/2
   NOX SAMPLE  PPM                                 66.1
   NOX BACKGRD METER READING/SCALE                   .2/3
   NOX BACKGRD PPM                                   .6

   HC  CONCENTRATION PPM                           355
   CO  CONCENTRATION PPM                          3292
   CO2 CONCENTRATION PCT                           .77
   NOX CONCENTRATION PPM                          65.6
   HC  MASS (GRAMS)                              86.10
   CO  MASS (GRAMS)                            1609.86
   CO2 MASS (GRAMS)                            5982.37
   NOX MASS (GRAMS)                              52.67

HC  GRAMS/MILE  11.84
CO  GRAMS/MILE  222.4
CO2 GRAMS/MILE    826
NOX GRAMS/MILE   7.27

HC  GRAMS/LB OF FUEL  13.23     HC  GRAMS/MIN   3.81
CO  GRAMS/LB OF FUEL  247.3     CO  GRAMS/MIN   71.2
CO2 GRAMS/LB OF FUEL    419     CO2 GRAMS/MIN    264
NOX GRAMS/LB OF FUEL   8.09     NOX GRAMS/MIN   2.33


TOTAL CARBON = 2397.60 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.10 LB.
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                     EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G3

DATE  8/12/74                    TIME  1145 HRS.          TEST NO.  4
MODEL  1967   FORD                BOX VAN                 ENGINE 300 CID I6
DRIVER  TLC                      TEST WT.  9140 LB.       GVW10000 LB.

WET BULB TEMP  80 F              DRY BULB TEMP  96 F      REL. HUM.  49.9 PCT
SPEC. HUM.  *9.6 GRAIN/LB        BARO.  29.52 IN. HG.     MEASURED FUEL  6.52 LB.

  RUN DURATION             21.23 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.5  IN. H2O
  BLOWER INLET TEMP.     125  DEG. F
  BLOWER REVOLUTIONS  24545
  BLOWER CU. FT./REV.   .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                30.9/3
   HC   SAMPLE  PPM                                 309
   HC   BACKGRD METER READING/SCALE                 3.1/3
   HC   BACKGRD PPM                                  31
   CO   SAMPLE  METER READING/SCALE                89.9/2
   CO   SAMPLE  PPM                                3808
   CO   BACKGRD METER READING/SCALE                 4.0/2
   CO   BACKGRD PPM                                 114
   CO2  SAMPLE  METER READING/SCALE                35.0/2
   CO2  SAMPLE  PERCENT                             .95
   CO2  BACKGRD METER READING/SCALE                 2.5/2
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                89.9/2
   NOX  SAMPLE  PPM                                89.9
   NOX  BACKGRD METER READING/SCALE                  .8/3
   NOX  BACKGRD PPM                                 2.4

   HC   CONCENTRATION PPM                           281
   CO   CONCENTRATION PPM                          3576
   CO2  CONCENTRATION PCT                           .89
   NOX  CONCENTRATION PPM                          87.7
   HC   MASS (GRAMS)                              63.34
   CO   MASS (GRAMS)                            1626.74
   CO2  MASS (GRAMS)                            6412.54
   NOX  MASS (GRAMS)                              65.57

HC   GRAMS/MILE    8.75
CO   GRAMS/MILE  224.7
CO2  GRAMS/MILE    886
NOX  GRAMS/MILE   9.06

HC   GRAMS/LB OF FUEL    9.72      HC   GRAMS/MIN   2.98
CO   GRAMS/LB OF FUEL  244.5       CO   GRAMS/MIN   76.6
CO2  GRAMS/LB OF FUEL    984       CO2  GRAMS/MIN    302
NOX  GRAMS/LB OF FUEL  10.06       NOX  GRAMS/MIN   3.09


TOTAL CARBON = 2502.53 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.37 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G3

DATE  8/13/74                 TIME    915 HRS.          TEST NO.  6
MODEL  1967  FORD              BOX VAN                  ENGINE 300 CID I6
DRIVER  TLC                   TEST WT.  9140 LB.        GVW10000 LB.

WET BULB TEMP  78 F           DRY BULB TEMP  89 F       REL. HUM.  61.3 PCT
SPEC. HUM.  *4.6 GRAIN/LB     BARO.  29.22 IN. HG.      MEASURED FUEL  6.07 LB.

  RUN DURATION           21.08 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      118  DEG. F
  BLOWER REVOLUTIONS    24446
  BLOWER CU. FT./REV.    .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              31.3/3
   HC   SAMPLE  PPM                               313
   HC   BACKGRD METER READING/SCALE               1.7/3
   HC   BACKGRD PPM                                17
   CO   SAMPLE  METER READING/SCALE              82.6/2
   CO   SAMPLE  PPM                              3361
   CO   BACKGRD METER READING/SCALE               2.2/2
   CO   BACKGRD PPM                                62
   CO2  SAMPLE  METER READING/SCALE              33.8/2
   CO2  SAMPLE  PERCENT                           .91
   CO2  BACKGRD METER READING/SCALE               2.9/2
   CO2  BACKGRD PERCENT                           .07
   NOX  SAMPLE  METER READING/SCALE              80.9/2
   NOX  SAMPLE  PPM                              80.9
   NOX  BACKGRD METER READING/SCALE                .6/3
   NOX  BACKGRD PPM                               1.8

    HC   CONCENTRATION PPM                       298
    CO   CONCENTRATION PPM                      3180
    CO2  CONCENTRATION PCT                       .85
    NOX  CONCENTRATION PPM                      79.3
    HC   MASS (GRAMS)                          67.18
    CO   MASS (GRAMS)                        1449.18
    CO2  MASS (GRAMS)                        6100.83
    NOX  MASS (GRAMS)                          59.34

HC   GRAMS/MILE    4.28
CO   GRAMS/MILE  200.2
CO2  GRAMS/MILE    843
NOX  GRAMS/MILE   8.20

HC   GRAMS/LB OF FUEL  11.07      HC   GRAMS/MIN   3.19
CO   GRAMS/LB OF FUEL  238.7      CO   GRAMS/MIN   68.7
CO2  GRAMS/LB OF FUEL   1005      CO2  GRAMS/MIN    289
NOX  GRAMS/LB OF FUEL   4.78      NOX  GRAMS/MIN   2.81


TOTAL CARBON = 2344.64 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.97 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G3

DATE  6/13/74                  TIME    945 HRS.          TEST NO.  7
MODEL  1967  FORD               BOX VAN                  ENGINE 300 CID I6
DRIVER  RKH                    TEST WT.  9140 LB.        GVW10000 LB.

WET BULB TEMP  78 F            DRY BULB TEMP  89 F       REL. HUM.  61.3 PCT
SPEC. HUM.  *9.6 GRAIN/LB  BARO.  29.22 IN. HG.   MEASURED FUEL  6.29 LB.

  RUN DURATION          19.79 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     120  DEG. F
  BLOWER REVOLUTIONS   22964
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               32.8/3
   HC  SAMPLE  PPM                                328
   HC  BACKGRD METER READING/SCALE                1.8/3
   HC  BACKGRD PPM                                 18
   CO  SAMPLE  METER READING/SCALE               87.1/2
   CO  SAMPLE  PPM                               3632
   CO  BACKGRD METER READING/SCALE                2.6/2
   CO  BACKGRD PPM                                 74
   CO2 SAMPLE  METER READING/SCALE               34.1/2
   CO2 SAMPLE  PERCENT                             .92
   CO2 BACKGRD METER READING/SCALE                2.6/2
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE               78.3/2
   NOX SAMPLE  PPM                               78.3
   NOX BACKGRD METER READING/SCALE                 .8/3
   NOX BACKGRD PPM                                2.4

  HC  CONCENTRATION PPM                           312
  CO  CONCENTRATION PPM                          3430
  CO2 CONCENTRATION PCT                           .86
  NOX CONCENTRATION PPM                          76.1
  HC  MASS (GRAMS)                              65.84
  CO  MASS (GRAMS)                            1462.63
  CO2 MASS (GRAMS)                            5814.54
  NOX MASS (GRAMS)                              53.33

HC  GRAMS/MILE    9.09
CO  GRAMS/MILE  202.0
CO2 GRAMS/MILE    803
NOX GRAMS/MILE   7.37

HC  GRAMS/LB OF FUEL  10.47     HC  GRAMS/MIN   3.33
CO  GRAMS/LB OF FUEL  232.5     CO  GRAMS/MIN   73.9
CO2 GRAMS/LB OF FUEL    924     CO2 GRAMS/MIN    294
NOX GRAMS/LB OF FUEL   8.48     NOX GRAMS/MIN   2.69


TOTAL CARBON = 2271.11 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.78 LB.
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                   EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                           TRUCK NUMBER  G3

DATE  8/13/74             TIME  1030 HRS.       TEST NO.  8
MODEL  1967  FORD          BOX VAN              ENGINE 300 CID I6
DRIVER  RKH               TEST WT.  9140 LB.    GVW10000 LB.

WET BULB TEMP  78 F       DRY BULB TEMP  89 F   REL. HUM.  61.3 PCT
SPEC. HUM.  *9.6 GRAIN/LB BARO.  29.22 IN. HG.  MEASURED FUEL  5.61 LB.

  RUN DURATION          18.13 MINUTES
  BLOWER INLET PRESS.     7.5 IN. H2O
  BLOWER DIF.  PRESS.    13.0 IN. H2O
  BLOWER INLET TEMP.      120 DEG. F
  BLOWER REVOLUTIONS    21006
  BLOWER CU. FT./REV.    .646

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE         35.1/3
   HC  SAMPLE  PPM                          351
   HC  BACKGRD METER READING/SCALE          1.8/3
   HC  BACKGRD PPM                           18
   CO  SAMPLE  METER READING/SCALE         86.7/2
   CO  SAMPLE  PPM                         3608
   CO  BACKGRD METER READING/SCALE          2.5/2
   CO  BACKGRD PPM                           71
   CO2 SAMPLE  METER READING/SCALE         32.9/2
   CO2 SAMPLE  PERCENT                      .89
   CO2 BACKGRD METER READING/SCALE          2.6/2
   CO2 BACKGRD PERCENT                      .06
   NOX SAMPLE  METER READING/SCALE         77.4/2
   NOX SAMPLE  PPM                         77.4
   NOX BACKGRD METER READING/SCALE           .3/3
   NOX BACKGRD PPM                           .9

   HC  CONCENTRATION PPM                    335
   CO  CONCENTRATION PPM                   3411
   CO2 CONCENTRATION PCT                    .83
   NOX CONCENTRATION PPM                   76.6
   HC  MASS (GRAMS)                       64.65
   CO  MASS (GRAMS)                     1330.42
   CO2 MASS (GRAMS)                     5100.21
   NOX MASS (GRAMS)                       49.06

HC  GRAMS/MILE   8.93
CO  GRAMS/MILE  183.8
CO2 GRAMS/MILE    704
NOX GRAMS/MILE   6.78

HC  GRAMS/LB OF FUEL  11.52     HC  GRAMS/MIN   3.57
CO  GRAMS/LB OF FUEL  237.2     CO  GRAMS/MIN   73.4
CO2 GRAMS/LB OF FUEL    909     CO2 GRAMS/MIN    281
NOX GRAMS/LB OF FUEL   8.75     NOX GRAMS/MIN   2.71


TOTAL CARBON = 2018.93 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.14 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G3

DATE  8/13/74                TIME  1105 HRS.          TEST NO.  9
MODEL  1967  FORD             BOX VAN                 ENGINE 300 CID I6
DRIVER  RKH                  TEST WT.  9150 LB.       GVW10000 LB.

WET BULB TEMP  78 F          DRY BULB TEMP  91 F      REL. HUM.  56.1 PCT
SPEC. HUM.  *6.1 GRAIN/LB    BARO.  29.22 IN. HG.     MEASURED FUEL  6.11 LB.

  RUN DURATION          19.95 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     115  DEG. F
  BLOWER REVOLUTIONS   23120
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              38.5/3
   HC   SAMPLE  PPM                               385
   HC   BACKGRD METER READING/SCALE               1.4/3
   HC   BACKGRD PPM                                14
   CO   SAMPLE  METER READING/SCALE              89.6/2
   CO   SAMPLE  PPM                              3789
   CO   BACKGRD METER READING/SCALE               2.4/2
   CO   BACKGRD PPM                                68
   CO2  SAMPLE  METER READING/SCALE              35.5/2
   CO2  SAMPLE  PERCENT                           .96
   CO2  BACKGRD METER READING/SCALE               2.8/2
   CO2  BACKGRD PERCENT                           .07
   NOX  SAMPLE  METER READING/SCALE              73.2/2
   NOX  SAMPLE  PPM                              73.2
   NOX  BACKGRD METER READING/SCALE                .6/3
   NOX  BACKGRD PPM                               1.8

   HC   CONCENTRATION PPM                        372
   CO   CONCENTRATION PPM                       3590
   CO2  CONCENTRATION PCT                         .90
   NOX  CONCENTRATION PPM                        71.6
   HC   MASS (GRAMS)                            79.98
   CO   MASS (GRAMS)                          1556.36
   CO2  MASS (GRAMS)                          6167.06
   NOX  MASS (GRAMS)                            50.98

HC   GRAMS/MILE  11.05
CO   GRAMS/MILE  215.0
CO2  GRAMS/MILE    852
NOX  GRAMS/MILE   7.04

HC   GRAMS/LB OF FUEL  13.09      HC   GRAMS/MIN   4.01
CO   GRAMS/LB OF FUEL  254.7      CO   GRAMS/MIN   78.0
CO2  GRAMS/LB OF FUEL   1009      CO2  GRAMS/MIN    309
NOX  GRAMS/LB OF FUEL   8.34      NOX  GRAMS/MIN   2.56


TOTAL CARBON = 2419.75 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.16 LB.
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TRUCK G-4

1969 CHEVROLET 18000 LB GVW VAN
WITH 350 CID V8 ENGINE
(2 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G4

DATE  8/21/74                TIME    930 HRS.         TEST NO.  1
MODEL  1969 CHEVROLET        BOX VAN                  ENGINE 350 CID V8
DRIVER  EMK                  TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  75 F          DRY BULB TEMP  80 F      REL. HUM.  79.4 PCT
SPEC. HUM.  *5.5 GRAIN/LB  BARO.  29.25 IN. HG.     MEASURED FUEL  7.45 LB.

  RUN DURATION           18.17 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      115  DEG. F
  BLOWER REVOLUTIONS    21162
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               11.4/4
   HC   SAMPLE  PPM                               1140
   HC   BACKGRD METER READING/SCALE                3.0/3
   HC   BACKGRD PPM                                 30
   CO   SAMPLE  METER READING/SCALE               43.2/1
   CO   SAMPLE  PPM                               3869
   CO   BACKGRD METER READING/SCALE                2.9/2
   CO   BACKGRD PPM                                 83
   CO2  SAMPLE  METER READING/SCALE               38.1/2
   CO2  SAMPLE  PERCENT                           1.04
   CO2  BACKGRD METER READING/SCALE                2.8/2
   CO2  BACKGRD PERCENT                            .07
   NOX  SAMPLE  METER READING/SCALE               53.0/2
   NOX  SAMPLE  PPM                               53.0
   NOX  BACKGRD METER READING/SCALE                 .1/2
   NOX  BACKGRD PPM                                 .1

   HC   CONCENTRATION PPM                         1113
   CO   CONCENTRATION PPM                         3621
   CO2  CONCENTRATION PCT                          .98
   NOX  CONCENTRATION PPM                         52.9
   HC   MASS (GRAMS)                            219.17
   CO   MASS (GRAMS)                           1439.08
   CO2  MASS (GRAMS)                           6145.78
   NOX  MASS (GRAMS)                             34.54

HC   GRAMS/MILE   30.27
CO   GRAMS/MILE   198.8
CO2  GRAMS/MILE     849
NOX  GRAMS/MILE    4.77

HC   GRAMS/LB OF FUEL   29.42     HC   GRAMS/MIN   12.06
CO   GRAMS/LB OF FUEL   193.2     CO   GRAMS/MIN    79.2
CO2  GRAMS/LB OF FUEL     825     CO2  GRAMS/MIN     338
NOX  GRAMS/LB OF FUEL    4.64     NOX  GRAMS/MIN    1.90


TOTAL CARBON = 2484.20 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.32 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER  G4

DATE  8/21/74                  TIME   959 HRS.           TEST NO.  2
MODEL  1969 CHEVROLET          BOX VAN                   ENGINE 350 CID V8
DRIVER  EMK                    TEST WT. 13475 LB.        GVW18000 LB.

WET BULB TEMP  75 F            DRY BULB TEMP  82 F       REL. HUM.  72.4 PCT
SPEC. HUM.  *2.0 GRAIN/LB      BARO.  29.24 IN. HG.      MEASURED FUEL  7.32 LB.

  RUN DURATION          18.87 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     115  DEG. F
  BLOWER REVOLUTIONS   22034
  BLOWER CU. FT./REV.   .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                11.4/4
   HC   SAMPLE  PPM                                1140
   HC   BACKGRD METER READING/SCALE                 2.8/3
   HC   BACKGRD PPM                                  28
   CO   SAMPLE  METER READING/SCALE                43.9/1
   CO   SAMPLE  PPM                                3966
   CO   BACKGRD METER READING/SCALE                 2.0/2
   CO   BACKGRD PPM                                  57
   CO2  SAMPLE  METER READING/SCALE                39.1/2
   CO2  SAMPLE  PERCENT                            1.07
   CO2  BACKGRD METER READING/SCALE                 3.0/2
   CO2  BACKGRD PERCENT                             .08
   NOX  SAMPLE  METER READING/SCALE                56.0/2
   NOX  SAMPLE  PPM                                56.0
   NOX  BACKGRD METER READING/SCALE                  .3/2
   NOX  BACKGRD PPM                                  .3

   HC   CONCENTRATION PPM                          1115
   CO   CONCENTRATION PPM                          3742
   CO2  CONCENTRATION PCT                          1.01
   NOX  CONCENTRATION PPM                          55.7
   HC   MASS (GRAMS)                             228.55
   CO   MASS (GRAMS)                            1548.35
   CO2  MASS (GRAMS)                            6567.58
   NOX  MASS (GRAMS)                              37.88

HC  GRAMS/MILE  31.57
CO  GRAMS/MILE  213.9
CO2 GRAMS/MILE    907
NOX GRAMS/MILE   5.23

HC  GRAMS/LB OF FUEL  31.22     HC  GRAMS/MIN  12.11
CO  GRAMS/LB OF FUEL  211.5     CO  GRAMS/MIN   82.1
CO2 GRAMS/LB OF FUEL    897     CO2 GRAMS/MIN    348
NOX GRAMS/LB OF FUEL   5.17     NOX GRAMS/MIN   2.01


TOTAL CARBON = 2654.30 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.76 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G4

DATE  8/21/74                 TIME  1042 HRS.          TEST NO.  3
MODEL  1969 CHEVROLET         BOX VAN                  ENGINE 350 CID V8
DRIVER  EMK                   TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  76 F           DRY BULB TEMP  88 F      REL. HUM.  57.9 PCT
SPEC. HUM.  *8.0 GRAIN/LB  BARO.  29.24 IN. HG.     MEASURED FUEL  7.14 LB.

  RUN DURATION          18.89 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     115  DEG. F
  BLOWER REVOLUTIONS   21997
  BLOWER CU. FT./REV.   .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                11.4/4
   HC  SAMPLE  PPM                                1140
   HC  BACKGRD METER READING/SCALE                 2.5/3
   HC  BACKGRD PPM                                  25
   CO  SAMPLE  METER READING/SCALE                42.9/1
   CO  SAMPLE  PPM                                3828
   CO  BACKGRD METER READING/SCALE                 1.9/2
   CO  BACKGRD PPM                                  54
   CO2 SAMPLE  METER READING/SCALE                38.3/2
   CO2 SAMPLE  PERCENT                            1.05
   CO2 BACKGRD METER READING/SCALE                 2.4/2
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE                57.0/2
   NOX SAMPLE  PPM                                57.0
   NOX BACKGRD METER READING/SCALE                  .4/3
   NOX BACKGRD PPM                                 1.2

   HC  CONCENTRATION PPM                          1118
   CO  CONCENTRATION PPM                          3633
   CO2 CONCENTRATION PCT                           .99
   NOX CONCENTRATION PPM                          55.9
   HC  MASS (GRAMS)                             228.64
   CO  MASS (GRAMS)                            1500.10
   CO2 MASS (GRAMS)                            6483.40
   NOX MASS (GRAMS)                              37.95

HC  GRAMS/MILE  31.58
CO  GRAMS/MILE  207.2
CO2 GRAMS/MILE    895
NOX GRAMS/MILE   5.24

HC  GRAMS/LB OF FUEL  32.02     HC  GRAMS/MIN  12.10
CO  GRAMS/LB OF FUEL  210.1     CO  GRAMS/MIN   79.4
CO2 GRAMS/LB OF FUEL    908     CO2 GRAMS/MIN    343
NOX GRAMS/LB OF FUEL   5.31     NOX GRAMS/MIN   2.01


TOTAL CARBON = 2610.71 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.65 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G4

DATE  8/21/74                  TIME  1111 HRS.          TEST NO.  4
MODEL  1969 CHEVROLET          BOX VAN                  ENGINE 350 CID V8
DRIVER  TLC                    TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  75 F            DRY BULB TEMP  90 F      REL. HUM.  49.9 PCT
SPEC. HUM.  *8.2 GRAIN/LB      BARO.  29.24 IN. HG.     MEASURED FUEL  8.08 LB.

  RUN DURATION           20.79 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      115  DEG. F
  BLOWER REVOLUTIONS   24172
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 10.7/4
   HC  SAMPLE  PPM                                 1070
   HC  BACKGRD METER READING/SCALE                  2.6/3
   HC  BACKGRD PPM                                   26
   CO  SAMPLE  METER READING/SCALE                 44.4/1
   CO  SAMPLE  PPM                                 4036
   CO  BACKGRD METER READING/SCALE                  1.9/2
   CO  BACKGRD PPM                                   54
   CO2 SAMPLE  METER READING/SCALE                 39.8/2
   CO2 SAMPLE  PERCENT                             1.09
   CO2 BACKGRD METER READING/SCALE                  2.4/2
   CO2 BACKGRD PERCENT                              .06
   NOX SAMPLE  METER READING/SCALE                 56.0/2
   NOX SAMPLE  PPM                                 56.0
   NOX BACKGRD METER READING/SCALE                   .2/2
   NOX BACKGRD PPM                                   .2

   HC  CONCENTRATION PPM                           1047
   CO  CONCENTRATION PPM                           3839
   CO2 CONCENTRATION PCT                           1.04
   NOX CONCENTRATION PPM                           55.8
   HC  MASS (GRAMS)                              235.63
   CO  MASS (GRAMS)                             1744.31
   CO2 MASS (GRAMS)                             7463.61
   NOX MASS (GRAMS)                               41.66

HC  GRAMS/MILE  32.55
CO  GRAMS/MILE  240.9
CO2 GRAMS/MILE   1030
NOX GRAMS/MILE   5.75

HC  GRAMS/LB OF FUEL  29.16     HC  GRAMS/MIN  11.34
CO  GRAMS/LB OF FUEL  215.9     CO  GRAMS/MIN   83.9
CO2 GRAMS/LB OF FUEL    923     CO2 GRAMS/MIN    359
NOX GRAMS/LB OF FUEL   5.16     NOX GRAMS/MIN   2.00


TOTAL CARBON = 2988.18 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.61 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G4

DATE  8/21/74                  TIME  1206 HRS.          TEST NO.  5
MODEL  1969 CHEVROLET          BOX VAN                  ENGINE 350 CID V8
DRIVER  TLC                    TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  93 F      REL. HUM.  48.6 PCT
SPEC. HUM.  *5.9 GRAIN/LB  BARO.  29.24 IN. HG.         MEASURED FUEL  7.90 LB.
  RUN DURATION            21.46 MINUTES
  BLOWER INLET PRESS.      7.0  IN. H20
  BLOWER DIF.  PRESS.     13.0  IN. H20
  BLOWER INLET TEMP.       125  DEG. F
  BLOWER REVOLUTIONS     24946
  BLOWER CU. FT./REV.     .644

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                       10.9/4
   HC   SAMPLE  PPM                                       1090
   HC   BACKGRD METER READING/SCALE                        2.0/3
   HC   BACKGRD PPM                                         20
   CO   SAMPLE  METER READING/SCALE                       40.8/1
   CO   SAMPLE  PPM                                       3550
   CO   BACKGRD METER READING/SCALE                        1.9/2
   CO   BACKGRD PPM                                         54
   CO2  SAMPLE  METER READING/SCALE                       39.0/2
   CO2  SAMPLE  PERCENT                                   1.07
   CO2  BACKGRD METER READING/SCALE                        2.3/2
   CO2  BACKGRD PERCENT                                    .06
   NOX  SAMPLE  METER READING/SCALE                       65.0/2
   NOX  SAMPLE  PPM                                       65.0
   NOX  BACKGRD METER READING/SCALE                         .4/2
   NOX  BACKGRD PPM
                                                            .4

  HC   CONCENTRATION PPM                                  1072
  CO   CONCENTRATION PPM                                  3374
  CO2  CONCENTRATION PCT                                  1.02
  NOX  CONCENTRATION PPM                                  64.6
  HC   MASS (GRAMS)                                     243.92
  CO   MASS (GRAMS)                                    1549.65
  CO2  MASS (GRAMS)                                    7379.73
  NOX  MASS (GRAMS)
                                                         48.77

HC   GRAMS/MILE  33.69
CO   GRAMS/MILE  214.0
CO2  GRAMS/MILE   1019
NOX  GRAMS/MILE   6.74

HC   GRAMS/LB OF FUEL  30.88     HC   GRAMS/MIN  11.37
CO   GRAMS/LB OF FUEL  196.2     CO   GRAMS/MIN   72.2
CO2  GRAMS/LB OF FUEL    934     CO2  GRAMS/MIN    344
NOX  GRAMS/LB OF FUEL   6.17     NOX  GRAMS/MIN   2.27


TOTAL CARBON = 2889.81 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.36 LB.
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                      EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G4

DATE  8/21/74                   TIME  1225 HRS.          TEST NO.  6
MODEL  1969 CHEVROLET           BOX VAN                  ENGINE 350 CID V8
DRIVER  TLC                     TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  78 F             DRY BULB TEMP  90 F      REL. HUM.  58.7 PCT
SPEC. HUM.  *7.8 GRAIN/LB       BARO.  29.24 IN. HG.     MEASURED FUEL  8.21 LB.

  RUN DURATION           19.06 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H20
  BLOWER DIF.  PRESS.    13.0  IN. H20
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS    22145
  BLOWER CU. FT./REV.    .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               11.8/4
   HC   SAMPLE  PPM                               1180
   HC   BACKGRD METER READING/SCALE                2.1/3
   HC   BACKGRD PPM                                 21
   CO   SAMPLE  METER READING/SCALE               47.0/1
   CO   SAMPLE  PPM                               4415
   CO   BACKGRD METER READING/SCALE                2.7/2
   CO   BACKGRD PPM                                 77
   CO2  SAMPLE  METER READING/SCALE               44.3/2
   CO2  SAMPLE  PERCENT                           1.23
   CO2  BACKGRD METER READING/SCALE                2.5/2
   CO2  BACKGRD PERCENT                            .06
   NOX  SAMPLE  METER READING/SCALE               83.0/2
   NOX  SAMPLE  PPM                               83.0
   NOX  BACKGRD METER READING/SCALE                 .2/3
   NOX  BACKGRD PPM                                 .6

   HC   CONCENTRATION PPM                         1162
   CO   CONCENTRATION PPM                         4161
   CO2  CONCENTRATION PCT                         1.18
   NOX  CONCENTRATION PPM                         82.5
   HC   MASS (GRAMS)                            231.94
   CO   MASS (GRAMS)                           1677.29
   CO2  MASS (GRAMS)                           7490.32
   NOX  MASS (GRAMS)                             54.61

HC   GRAMS/MILE  32.04
CO   GRAMS/MILE  231.7
CO2  GRAMS/MILE   1035
NOX  GRAMS/MILE   7.54

HC   GRAMS/LB OF FUEL  28.25      HC   GRAMS/MIN  12.17
CO   GRAMS/LB OF FUEL  204.3      CO   GRAMS/MIN   88.0
CO2  GRAMS/LB OF FUEL    912      CO2  GRAMS/MIN    393
NOX  GRAMS/LB OF FUEL   6.65      NOX  GRAMS/MIN   2.87


TOTAL CARBON = 2964.36 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.55 LB.
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                        EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G4

DATE  8/21/74
MODEL  1969 CHEVROLET       TIME  1244 HRS.          TEST NO.  7
DRIVER  RKH                 BOX VAN                  ENGINE 350 CID V8
                            TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  78 F         DRY BULB TEMP  97 F      REL. HUM.  42.9 PCT
SPEC. HUM.  45.6 GRAIN/LB   BARO.  29.24 IN. HG.     MEASURED FUEL  7.63 LB.

  RUN DURATION            18.81 MINUTES
  BLOWER INLET PRESS.      7.0  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       124  DEG. F
  BLOWER REVOLUTIONS     21853
  BLOWER CU. FT./REV.     .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE
   HC   SAMPLE  PPM                                    11.0/4
   HC   BACKGRD METER READING/SCALE                    1100
   HC   BACKGRD PPM                                     2.0/3
   CO   SAMPLE  METER READING/SCALE                     20
   CO   SAMPLE  PPM                                    46.5/1
   CO   BACKGRD METER READING/SCALE                    4340
   CO   BACKGRD PPM                                     2.7/2
   CO2  SAMPLE  METER READING/SCALE                     77
   CO2  SAMPLE  PERCENT                                40.4/2
   CO2  BACKGRD METER READING/SCALE                    1.11
   CO2  BACKGRD PERCENT                                 2.6/2
   NOX  SAMPLE  METER READING/SCALE                     .06
   NOX  SAMPLE  PPM                                    20.3/3
   NOX  BACKGRD METER READING/SCALE                    60.9
   NOX  BACKGRD PPM                                     1.9/3
                                                        5.7

  HC   CONCENTRATION PPM
  CO   CONCENTRATION PPM                               1082
  CO2  CONCENTRATION PCT                               4121
  NOX  CONCENTRATION PPM                               1.05
  HC   MASS (GRAMS)                                    55.9
  CO   MASS (GRAMS)                                  216.17
  CO2  MASS (GRAMS)                                 1661.42
  NOX  MASS (GRAMS)                                 6710.28
                                                      37.02

HC   GRAMS/MILE  29.86
CO   GRAMS/MILE  229.5
CO2  GRAMS/MILE    927
NOX  GRAMS/MILE   5.11

HC   GRAMS/LB OF FUEL  28.33      HC   GRAMS/MIN  11.49
CO   GRAMS/LB OF FUEL  217.7      CO   GRAMS/MIN   88.3
CO2  GRAMS/LB OF FUEL    879      CO2  GRAMS/MIN    357
NOX  GRAMS/LB OF FUEL   4.85      NOX  GRAMS/MIN   1.97


TOTAL CARBON = 2731.00 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.95 LB.
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                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER  G4

DATE  8/21/74                TIME  1315 HRS.          TEST NO.  8
MODEL  1969 CHEVROLET        BOX VAN                  ENGINE 350 CID V8
DRIVER  RKH                  TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  76 F          DRY BULB TEMP  96 F      REL. HUM.  40.0 PCT
SPEC. HUM.  *4.2 GRAIN/LB    BARO.  29.24 IN. HG.     MEASURED FUEL  7.80 LB.

  RUN DURATION          20.24 MINUTES
  BLOWER INLET PRESS.    7.0  IN. H20
  BLOWER DIF.  PRESS.   12.5  IN. H20
  BLOWER INLET TEMP.     130  DEG. F
  BLOWER REVOLUTIONS   23524
  BLOWER CU. FT./REV.   .644

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE             10.6/4
   HC  SAMPLE  PPM                             1060
   HC  BACKGRD METER READING/SCALE              2.8/3
   HC  BACKGRD PPM                               28
   CO  SAMPLE  METER READING/SCALE             42.5/1
   CO  SAMPLE  PPM                             3774
   CO  BACKGRD METER READING/SCALE              2.6/2
   CO  BACKGRD PPM                               74
   CO2 SAMPLE  METER READING/SCALE             40.3/2
   CO2 SAMPLE  PERCENT                         1.11
   CO2 BACKGRD METER READING/SCALE              2.2/2
   CO2 BACKGRD PERCENT                          .05
   NOX SAMPLE  METER READING/SCALE             24.4/3
   NOX SAMPLE  PPM                             73.2
   NOX BACKGRD METER READING/SCALE              1.4/3
   NOX BACKGRD PPM                              4.2

   HC  CONCENTRATION PPM                      1035
   CO  CONCENTRATION PPM                      3581
   CO2 CONCENTRATION PCT                      1.06
   NOX CONCENTRATION PPM                      69.5
   HC  MASS (GRAMS)                          219.93
   CO  MASS (GRAMS)                         1535.64
   CO2 MASS (GRAMS)                         7175.26
   NOX MASS (GRAMS)                           48.96

HC  GRAMS/MILE  30.38
CO  GRAMS/MILE  212.1
CO2 GRAMS/MILE    991
NOX GRAMS/MILE   6.76

HC  GRAMS/LB OF FUEL  28.20     HC  GRAMS/MIN  10.86
CO  GRAMS/LB OF FUEL  196.9     CO  GRAMS/MIN   75.9
CO2 GRAMS/LB OF FUEL    920     CO2 GRAMS/MIN    354
NOX GRAMS/LB OF FUEL   6.28     NOX GRAMS/MIN   2.42


TOTAL CARBON = 2807.23 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.15 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER  G4

DATE  8/21/74                  TIME  1343 HRS.           TEST NO.  9
MODEL  1969 CHEVROLET          BOX VAN                   ENGINE 350 CID V8
DRIVER  RKH                    TEST WT. 13475 LB.        GVW18000 LB.

WET BULB TEMP  78 F            DRY BULB TEMP 102 F       REL. HUM.  34.2 PCT
SPEC. HUM.  *7.0 GRAIN/LB      BARO.  29.24 IN. HG.      MEASURED FUEL  7.18 LB.

  RUN DURATION           17.78 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    12.5  IN. H2O
  BLOWER INLET TEMP.      125  DEG. F
  BLOWER REVOLUTIONS    20643
  BLOWER CU. FT./REV.    .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              11.2/4
   HC   SAMPLE  PPM                              1120
   HC   BACKGRD METER READING/SCALE               2.9/3
   HC   BACKGRD PPM                                29
   CO   SAMPLE  METER READING/SCALE              44.9/1
   CO   SAMPLE  PPM                              4107
   CO   BACKGRD METER READING/SCALE               3.7/2
   CO   BACKGRD PPM                               106
   CO2  SAMPLE  METER READING/SCALE              41.1/2
   CO2  SAMPLE  PERCENT                          1.13
   CO2  BACKGRD METER READING/SCALE               2.6/2
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              24.1/3
   NOX  SAMPLE  PPM                              72.3
   NOX  BACKGRD METER READING/SCALE               1.5/3
   NOX  BACKGRD PPM                               4.5

   HC   CONCENTRATION PPM                        1095
   CO   CONCENTRATION PPM                        3880
   CO2  CONCENTRATION PCT                        1.08
   NOX  CONCENTRATION PPM                        68.4
   HC   MASS (GRAMS)                           206.36
   CO   MASS (GRAMS)                          1477.04
   CO2  MASS (GRAMS)                          6463.50
   NOX  MASS (GRAMS)                            42.74

HC   GRAMS/MILE  28.50
CO   GRAMS/MILE  204.0
CO2  GRAMS/MILE    893
NOX  GRAMS/MILE   5.90

HC   GRAMS/LB OF FUEL  28.74      HC   GRAMS/MIN  11.61
CO   GRAMS/LB OF FUEL  205.7      CO   GRAMS/MIN   83.1
CO2  GRAMS/LB OF FUEL    900      CO2  GRAMS/MIN    364
NOX  GRAMS/LB OF FUEL   5.95      NOX  GRAMS/MIN   2.40


TOTAL CARBON = 2576.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.56 LB.
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TRUCK G-5

1967 DODGE 19500 LB GVW STAKE BODY
WITH 318 CID V8 ENGINE
(6 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G5

DATE  8/29/74                  TIME  1045 HRS.          TEST NO.  1
MODEL  1967 DODGE              STAKE BFD                ENGINE 318 CID V8
DRIVER  EMK                    TEST WT. 13875 LB.       GVW19500 LB.

WET BULB TEMP  76 F            DRY BULB TEMP  79 F      REL. HUM.  87.3 PCT
SPEC. HUM.  *4.5 GRAIN/LB      BARO.  29.07 IN. HG.     MEASURED FUEL  8.06 LB.

  RUN DURATION           22.17 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H20
  BLOWER DIF.  PRESS.    13.0  IN. H20
  BLOWER INLET TEMP.      110  DEG. F
  BLOWER REVOLUTIONS    25679
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               86.9/3
   HC  SAMPLE  PPM                                869
   HC  BACKGRD METER READING/SCALE                2.4/3
   HC  BACKGRD PPM                                 24
   CO  SAMPLE  METER READING/SCALE               48.1/1
   CO  SAMPLE  PPM                               4583
   CO  BACKGRD METER READING/SCALE                 .6/1
   CO  BACKGRD PPM                                 35
   CO2 SAMPLE  METER READING/SCALE               31.4/2
   CO2 SAMPLE  PERCENT                            .84
   CO2 BACKGRD METER READING/SCALE                 .8/1
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               27.0/2
   NOX SAMPLE  PPM                               27.0
   NOX BACKGRD METER READING/SCALE                1.2/3
   NOX BACKGRD PPM                                3.6

   HC  CONCENTRATION PPM                          847
   CO  CONCENTRATION PPM                         4349
   CO2 CONCENTRATION PCT                          .79
   NOX CONCENTRATION PPM                         23.8
   HC  MASS (GRAMS)                            203.14
   CO  MASS (GRAMS)                           2104.57
   CO2 MASS (GRAMS)                           6006.91
   NOX MASS (GRAMS)                             18.90

HC  GRAMS/MILE  28.06
CO  GRAMS/MILE  290.7
CO2 GRAMS/MILE    830
NOX GRAMS/MILE   2.61

HC  GRAMS/LB OF FUEL  25.20      HC  GRAMS/MIN   9.16
CO  GRAMS/LB OF FUEL  261.1      CO  GRAMS/MIN   94.9
CO2 GRAMS/LB OF FUEL    745      CO2 GRAMS/MIN    271
NOX GRAMS/LB OF FUEL   2.34      NOX GRAMS/MIN    .85


TOTAL CARBON = 2717.79 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.92 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G5

DATE  8/29/74                 TIME  1120 HRS.          TEST NO.  2
MODEL  1967 DODGE             STAKE BED                ENGINE 318 CID V8
DRIVER  EMK                   TEST WT. 13875 LB.       GVW19500 LB.

WET BULB TEMP  77 F           DRY BULB TEMP  83 F      REL. HUM.  76.4 PCT
SPEC. HUM.  *4.1 GRAIN/LB  BARO.  29.07 IN. HG.     MEASURED FUEL  7.98 LB.

  RUN DURATION            19.92 MINUTES
  BLOWER INLET PRESS.      7.0  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       110  DEG. F
  BLOWER REVOLUTIONS     23063
  BLOWER CU. FT./REV.     .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                90.8/3
   HC  SAMPLE  PPM                                 908
   HC  BACKGRD METER READING/SCALE                 2.4/3
   HC  BACKGRD PPM                                  24
   CO  SAMPLE  METER READING/SCALE                50.6/1
   CO  SAMPLE  PPM                                4983
   CO  BACKGRD METER READING/SCALE                  .3/1
   CO  BACKGRD PPM                                  18
   CO2 SAMPLE  METER READING/SCALE                36.1/2
   CO2 SAMPLE  PERCENT                             .98
   CO2 BACKGRD METER READING/SCALE                 2.1/2
   CO2 BACKGRD PERCENT                             .05
   NOX SAMPLE  METER READING/SCALE                32.0/2
   NOX SAMPLE  PPM                                32.0
   NOX BACKGRD METER READING/SCALE                  .8/3
   NOX BACKGRD PPM                                 2.4

   HC  CONCENTRATION PPM                           887
   CO  CONCENTRATION PPM                          4751
   CO2 CONCENTRATION PCT                           .93
   NOX CONCENTRATION PPM                          29.9
   HC  MASS (GRAMS)                             190.91
   CO  MASS (GRAMS)                            2065.08
   CO2 MASS (GRAMS)                            6418.34
   NOX MASS (GRAMS)                              21.33

HC  GRAMS/MILE  26.37
CO  GRAMS/MILE  285.2
CO2 GRAMS/MILE    887
NOX GRAMS/MILE   2.95

HC  GRAMS/LB OF FUEL  23.92     HC  GRAMS/MIN   9.58
CO  GRAMS/LB OF FUEL  258.8     CO  GRAMS/MIN  103.7
CO2 GRAMS/LB OF FUEL    804     CO2 GRAMS/MIN    322
NOX GRAMS/LB OF FUEL   2.67     NOX GRAMS/MIN   1.07


TOTAL CARBON = 2802.55 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.13 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G5

DATE  8/29/74                  TIME  1145 HRS.          TEST NO.  3
MODEL  1967 DODGE              STAKE BED                ENGINE 318 CID V8
DRIVER  EMK                    TEST WT. 13875 LB.       GVW19500 LB.

WET BULB TEMP  78 F            DRY BULB TEMP  86 F      REL. HUM.  70.1 PCT
SPEC. HUM.  *5.6 GRAIN/LB      BARO.  29.07 IN. HG.     MEASURED FUEL  7.54 LB.

  RUN DURATION             18.57 MINUTES
  BLOWER INLET PRESS.       7.0  IN. H2O
  BLOWER DIF.  PRESS.      13.0  IN. H2O
  BLOWER INLET TEMP.        110  DEG. F
  BLOWER REVOLUTIONS     21472
  BLOWER CU. FT./REV.     .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                97.6/3
   HC   SAMPLE  PPM                                 976
   HC   BACKGRD METER READING/SCALE                 2.4/3
   HC   BACKGRD PPM                                  24
   CO   SAMPLE  METER READING/SCALE                53.1/1
   CO   SAMPLE  PPM                                5412
   CO   BACKGRD METER READING/SCALE                  .9/2
   CO   BACKGRD PPM                                  25
   CO2  SAMPLE  METER READING/SCALE                35.8/2
   CO2  SAMPLE  PERCENT                              .97
   CO2  BACKGRD METER READING/SCALE                 1.8/2
   CO2  BACKGRD PERCENT                              .04
   NOX  SAMPLE  METER READING/SCALE                26.0/2
   NOX  SAMPLE  PPM                                26.0
   NOX  BACKGRD METER READING/SCALE                  .6/3
   NOX  BACKGRD PPM                                 1.8

   HC   CONCENTRATION PPM                           955
   CO   CONCENTRATION PPM                          5166
   CO2  CONCENTRATION PCT                           .93
   NOX  CONCENTRATION PPM                          24.4
   HC   MASS (GRAMS)                             191.36
   CO   MASS (GRAMS)                            2090.24
   CO2  MASS (GRAMS)                            5961.14
   NOX  MASS (GRAMS)                              16.23

HC   GRAMS/MILE  26.43
CO   GRAMS/MILE  288.7
CO2  GRAMS/MILE    823
NOX  GRAMS/MILE   2.24

HC   GRAMS/LB OF FUEL  25.38      HC   GRAMS/MIN  10.30
CO   GRAMS/LB OF FUEL  277.2      CO   GRAMS/MIN  112.5
CO2  GRAMS/LB OF FUEL    791      CO2  GRAMS/MIN    321
NOX  GRAMS/LB OF FUEL   2.15      NOX  GRAMS/MIN    .87


TOTAL CARBON = 2688.95 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.95 LB.
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                     EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G5

DATE  8/29/74                      TIME  1230 HRS.           TEST NO.  4
MODEL  1967 DODGE                  STAKE BED                 ENGINE 318 CID V8
DRIVER  JHH                        TEST WT. 13875 LB.        GVW19500 LB.

WET BULB TEMP  79 F                DRY BULB TEMP  86 F       REL. HUM.  73.6 PCT
SPEC. HUM.  *2.5 GRAIN/LB          BARO.  29.08 IN. HG.      MEASURED FUEL  7.63 LB.

  RUN DURATION            20.48 MINUTES
  BLOWER INLET PRESS.      7.0  IN. H20
  BLOWER DIF.  PRESS.     13.0  IN. H20
  BLOWER INLET TEMP.       110  DEG. F
  BLOWER REVOLUTIONS     23798
  BLOWER CU. FT./REV.     .647

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                    78.7/3
   HC   SAMPLE   PPM                                     787
   HC   BACKGRD METER READING/SCALE                      1.6/3
   HC   BACKGRD PPM                                       16
   CO   SAMPLE   METER READING/SCALE                    46.9/1
   CO   SAMPLE   PPM                                    4400
   CO   BACKGRD METER READING/SCALE                       .9/2
   CO   BACKGRD PPM                                       25
   CO2 SAMPLE   METER READING/SCALE                     36.0/2
   CO2 SAMPLE   PERCENT                                  .98
   CO2 BACKGRD METER READING/SCALE                       1.9/2
   CO2 BACKGRD PERCENT                                   .05
   NOX SAMPLE   METER READING/SCALE                     42.0/2
   NOX SAMPLE   PPM                                     42.0
   NOX BACKGRD METER READING/SCALE                        .3/3
   NOX BACKGRD PPM                                        .9

   HC   CONCENTRATION PPM                                773
   CO   CONCENTRATION PPM                               4190
   CO2 CONCENTRATION PCT                                 .94
   NOX CONCENTRATION PPM                                41.2
   HC   MASS (GRAMS)                                  171.78
   CO   MASS (GRAMS)                                 1880.60
   CO2 MASS (GRAMS)                                  6635.73
   NOX MASS (GRAMS)                                    30.37

HC   GRAMS/MILE   23.73
CO   GRAMS/MILE   259.8
CO2 GRAMS/MILE      917
NOX GRAMS/MILE     4.20

HC   GRAMS/LB OF FUEL  22.51      HC   GRAMS/MIN    8.39
CO   GRAMS/LB OF FUEL  246.5      CO   GRAMS/MIN    91.8
CO2 GRAMS/LB OF FUEL     870      CO2 GRAMS/MIN      324
NOX GRAMS/LB OF FUEL    3.98      NOX GRAMS/MIN     1.48


TOTAL CARBON = 2766.20 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.04 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                    TRUCK NUMBER  65

DATE  8/29/74
MODEL  1967 DODGE             TIME  1300 HRS.          TEST NO.  5
DRIVER  JHH                   STAKE BED                ENGINE 318 CID V8
                              TEST WT. 13875 LB.       GVW19500 LB.

WET BULB TEMP  79 F           DRY BULB TEMP  89 F      REL. HUM.  64.5 PCT
SPEC. HUM.  *7.4 GRAIN/LB     BARO.  29.04 IN. HG.     MEASURED FUEL  7.57 LB.

  RUN DURATION              18.54 MINUTES
  BLOWER INLET PRESS.        7.0  IN. H2O
  BLOWER DIF.  PRESS.       13.0  IN. H2O
  BLOWER INLET TEMP.         110  DEG. F
  BLOWER REVOLUTIONS       21702
  BLOWER CU. FT./REV.       .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE
   HC   SAMPLE  PPM                                  88.9/3
   HC   BACKGRD METER READING/SCALE                   889
   HC   BACKGRD PPM                                   1.6/3
   CO   SAMPLE  METER READING/SCALE                    16
   CO   SAMPLE  PPM                                  51.3/1
   CO   BACKGRD METER READING/SCALE                  5100
   CO   BACKGRD PPM                                    .9/2
   CO2  SAMPLE  METER READING/SCALE                    25
   CO2  SAMPLE  PERCENT                              37.2/2
   CO2  BACKGRD METER READING/SCALE                  1.01
   CO2  BACKGRD PERCENT                               2.1/2
   NOX  SAMPLE  METER READING/SCALE                   .05
   NOX  SAMPLE  PPM                                  34.0/2
   NOX  BACKGRD METER READING/SCALE                  34.0
   NOX  BACKGRD PPM                                    .7/3
                                                      2.1

  HC   CONCENTRATION PPM
  CO   CONCENTRATION PPM                              875
  CO2  CONCENTRATION PCT                             4873
  NOX  CONCENTRATION PPM                              .97
  HC   MASS (GRAMS)                                  32.1
  CO   MASS (GRAMS)                                177.20
  CO2  MASS (GRAMS)                               1992.47
  NOX  MASS (GRAMS)                               6251.46
                                                    21.60

HC   GRAMS/MILE  24.48
CO   GRAMS/MILE  275.2
CO2  GRAMS/MILE    863
NOX  GRAMS/MILE   2.98

HC   GRAMS/LB OF FUEL  23.41     HC   GRAMS/MIN   9.56
CO   GRAMS/LB OF FUEL  263.2     CO   GRAMS/MIN  107.5
CO2  GRAMS/LB OF FUEL    826     CO2  GRAMS/MIN    337
NOX  GRAMS/LB OF FUEL   2.85     NOX  GRAMS/MIN   1.17


TOTAL CARBON = 2714.00 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.91 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G5

DATE  8/29/74               TIME  1430 HRS.          TEST NO.  6
MODEL  1967 DODGE           STAKE BED                ENGINE 318 CID V8
DRIVER  JHH                 TEST WT.    -0 LB.       GVW19500 LB.

WET BULB TEMP  81 F         DRY BULB TEMP  78 F      REL. HUM.  43.7 PCT
SPEC. HUM.  41.0 GRAIN/LB   BARO.  29.07 IN. HG.     MEASURED FUEL  7.51 LB.

  RUN DURATION           19.01 MINUTES
  BLOWER INLET PRESS.    7.0  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     130  DEG. F
  BLOWER REVOLUTIONS   22320
  BLOWER CU. FT./REV.   .643

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 91.5/3
   HC  SAMPLE  PPM                                  915
   HC  BACKGRD METER READING/SCALE                  1.5/3
   HC  BACKGRD PPM                                   15
   CO  SAMPLE  METER READING/SCALE                 48.2/1
   CO  SAMPLE  PPM                                 4598
   CO  BACKGRD METER READING/SCALE                  1.0/2
   CO  BACKGRD PPM                                   28
   CO2 SAMPLE  METER READING/SCALE                 38.9/2
   CO2 SAMPLE  PERCENT                             1.07
   CO2 BACKGRD METER READING/SCALE                  1.8/2
   CO2 BACKGRD PERCENT                              .04
   NOX SAMPLE  METER READING/SCALE                 49.0/2
   NOX SAMPLE  PPM                                 49.0
   NOX BACKGRD METER READING/SCALE                  .4/3
   NOX BACKGRD PPM                                  1.2

   HC  CONCENTRATION PPM                            902
   CO  CONCENTRATION PPM                           4311
   CO2 CONCENTRATION PCT                           1.03
   NOX CONCENTRATION PPM                           47.9
   HC  MASS (GRAMS)                              180.50
   CO  MASS (GRAMS)                             1742.23
   CO2 MASS (GRAMS)                             6546.61
   NOX MASS (GRAMS)                               31.83

HC  GRAMS/MILE  24.93
CO  GRAMS/MILE  240.6
CO2 GRAMS/MILE    904
NOX GRAMS/MILE   4.40

HC  GRAMS/LB OF FUEL  24.03     HC  GRAMS/MIN   9.50
CO  GRAMS/LB OF FUEL  232.0     CO  GRAMS/MIN   91.7
CO2 GRAMS/LB OF FUEL    872     CO2 GRAMS/MIN    344
NOX GRAMS/LB OF FUEL   4.24     NOX GRAMS/MIN   1.67


TOTAL CARBON = 2690.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.85 LB.
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TRUCK G-6

1968 IHC 27500 LB GVW DUMP BODY
WITH 345 CID V8 ENGINE
(9 SARR TESTS)

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              EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                          TRUCK NUMBER  G6

DATE  9/10/74                   TIME  1230 HRS.          TEST NO.  2
MODEL  1968 INTERNATIONAL  DUMP TRUCK               ENGINE 345 CID V8
DRIVER  EMK                     TEST WT. 18960 LB.       GVW27500 LB.

WET BULB TEMP  75 F             DRY BULB TEMP  83 F      REL. HUM.  69.2 PCT
SPEC. HUM.  *1.4 GRAIN/LB  BARO.  29.01 IN. HG.     MEASURED FUEL  9.84 LB.

  RUN DURATION           21.88 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.    13.0  IN. H20
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS  25306
  BLOWER CU. FT./REV.   .642

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                  64.7/3
   HC   SAMPLE   PPM                                   647
   HC   BACKGRD METER READING/SCALE                    1.2/3
   HC   BACKGRD PPM                                     12
   CO   SAMPLE   METER READING/SCALE                  91.1/2
   CO   SAMPLE   PPM                                  3885
   CO   BACKGRD METER READING/SCALE                    1.9/2
   CO   BACKGRD PPM                                     54
   CO2 SAMPLE   METER READING/SCALE                   53.1/2
   CO2 SAMPLE   PERCENT                               1.51
   CO2 BACKGRD METER READING/SCALE                     2.4/2
   CO2 BACKGRD PERCENT                                 .06
   NOX SAMPLE   METER READING/SCALE                   74.0/2
   NOX SAMPLE   PPM                                   74.0
   NOX BACKGRD METER READING/SCALE                      .3/2
   NOX BACKGRD PPM                                      .3

   HC   CONCENTRATION PPM                              637
   CO   CONCENTRATION PPM                             3640
   CO2 CONCENTRATION PCT                              1.46
   NOX CONCENTRATION PPM                              73.7
   HC   MASS (GRAMS)                                143.80
   CO   MASS (GRAMS)                               1659.68
   CO2 MASS (GRAMS)                               10512.84
   NOX MASS (GRAMS)                                  55.23

HC   GRAMS/MILE  19.86
CO   GRAMS/MILE  229.2
CO2 GRAMS/MILE   1452
NOX GRAMS/MILE   7.63

HC   GRAMS/LB OF FUEL  14.61      HC   GRAMS/MIN   6.57
CO   GRAMS/LB OF FUEL  168.7      CO   GRAMS/MIN   75.8
CO2 GRAMS/LB OF FUEL   1068      CO2 GRAMS/MIN    480
NOX GRAMS/LB OF FUEL   5.61      NOX GRAMS/MIN   2.52


TOTAL CARBON = 3705.38 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.43 LB.
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                    EXHAUST [illegible]
                            TRUCK [illegible]

DATE  4/10/74                 TIME  1315 HRS.           TEST NO.  3
MODEL  1968 INTERNATIONAL     DUMP TRUCK                ENGINE 345 CID V8
DRIVER  EMK                   TEST WT. 18900 LB.        GVW27500 LB.

WET BULB TEMP  74 F           DRY BULB TEMP  83 F       REL. HUM.  65.7 PCT
SPEC. HUM.  *5.1 GRAIN/LB     BARO.  29.02 IN. HG.      MEASURED FUEL 10.13 LB.

  RUN DURATION           20.42 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS   23789
  BLOWER CU. FT./REV.   .642

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 76.1/3
   HC   SAMPLE  PPM                                 761
   HC   BACKGRD METER READING/SCALE                  2.5/3
   HC   BACKGRD PPM                                  25
   CO   SAMPLE  METER READING/SCALE                 41.5/1
   CO   SAMPLE  PPM                                3641
   CO   BACKGRD METER READING/SCALE                  2.0/2
   CO   BACKGRD PPM                                  57
   CO2  SAMPLE  METER READING/SCALE                 55.5/2
   CO2  SAMPLE  PERCENT                             1.54
   CO2  BACKGRD METER READING/SCALE                  2.3/2
   CO2  BACKGRD PERCENT                              .06
   NOX  SAMPLE  METER READING/SCALE                 80.0/2
   NOX  SAMPLE  PPM                                 80.0
   NOX  BACKGRD METER READING/SCALE                  .3/2
   NOX  BACKGRD PPM                                  .3

   HC   CONCENTRATION PPM                          740
   CO   CONCENTRATION PPM                         3405
   CO2  CONCENTRATION PCT                         1.54
   NOX  CONCENTRATION PPM                         79.7
   HC   MASS (GRAMS)                            157.21
   CO   MASS (GRAMS)                           1461.00
   CO2  MASS (GRAMS)                          10443.11
   NOX  MASS (GRAMS)                             56.21

HC   GRAMS/MILE  21.71
CO   GRAMS/MILE  201.8
CO2  GRAMS/MILE   1442
NOX  GRAMS/MILE   7.76

HC   GRAMS/LB OF FUEL  15.52      HC   GRAMS/MIN    7.70
CO   GRAMS/LB OF FUEL  144.2      CO   GRAMS/MIN    71.5
CO2  GRAMS/LB OF FUEL   1031      CO2  GRAMS/MIN     511
NOX  GRAMS/LB OF FUEL   5.55      NOX  GRAMS/MIN    2.75


TOTAL CARBON = 3612.77 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.20 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G6

DATE  9/10/74                 TIME  1345 HRS.          TEST NO.  4
MODEL  1968 INTERNATIONAL  DUMP TRUCK               ENGINE 345 CID V8
DRIVER  GEM                   TEST WT. 18960 LB.     GV*27500 LB.

WET BULB TEMP  72 F           DRY BULB TEMP  80 F    REL. HUM.  68.2 PCT
SPEC. HUM.  *8.1 GRAIN/LB  BARO.  29.02 IN. HG.   MEASURED FUEL 10.79 LB.

  RUN DURATION          23.24 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  13.0  IN. H2O
  BLOWER INLET TEMP.    125  DEG. F
  BLOWER REVOLUTIONS  26910
  BLOWER CU. FT./REV.  .644

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 54.3/3
   HC  SAMPLE  PPM                                  543
   HC  BACKGRD METER READING/SCALE                  2.3/3
   HC  BACKGRD PPM                                   23
   CO  SAMPLE  METER READING/SCALE                 66.6/2
   CO  SAMPLE  PPM                                 3601
   CO  BACKGRD METER READING/SCALE                  1.5/2
   CO  BACKGRD PPM                                   42
   CO2 SAMPLE  METER READING/SCALE                 56.7/2
   CO2 SAMPLE  PERCENT                             1.63
   CO2 BACKGRD METER READING/SCALE                  2.6/2
   CO2 BACKGRD PERCENT                              .06
   NOX SAMPLE  METER READING/SCALE                 78.0/2
   NOX SAMPLE  PPM                                 78.0
   NOX BACKGRD METER READING/SCALE                   .3/2
   NOX BACKGRD PPM                                   .3

   HC  CONCENTRATION PPM                            523
   CO  CONCENTRATION PPM                           3374
   CO2 CONCENTRATION PCT                           1.57
   NOX CONCENTRATION PPM                           77.7
   HC  MASS (GRAMS)                              127.21
   CO  MASS (GRAMS)                             1655.37
   CO2 MASS (GRAMS)                            12201.55
   NOX MASS (GRAMS)                               62.66

HC  GRAMS/MILE  17.57
CO  GRAMS/MILE  228.6
CO2 GRAMS/MILE   1685
NOX GRAMS/MILE   8.65

HC  GRAMS/LB OF FUEL  11.79      HC  GRAMS/MIN   5.47
CO  GRAMS/LB OF FUEL  153.4      CO  GRAMS/MIN   71.2
CO2 GRAMS/LB OF FUEL   1131      CO2 GRAMS/MIN    525
NOX GRAMS/LB OF FUEL   5.81      NOX GRAMS/MIN   2.70


TOTAL CARBON = 4150.05 GRAMS
CARBON BALANCE FUEL WEIGHT = 10.56 LB.
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                      EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                   TRUCK NUMBER  G6

DATE  9/10/74                  TIME  1430 HRS.          TEST NO.  5
MODEL  1968 INTERNATIONAL      DUMP TRUCK               ENGINE 345 CID V8
DRIVER  GEM                    TEST WT. 18960 LB.       GVW27500 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  89 F      REL. HUM.  58.3 PCT
SPEC. HUM.  43.9 GRAIN/LB      BARO.  29.02 IN. HG.     MEASURED FUEL 10.95 LB.

  RUN DURATION            19.94 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H20
  BLOWER DIF.  PRESS.     13.0  IN. H20
  BLOWER INLET TEMP.       125  DEG. F
  BLOWER REVOLUTIONS     22988
  BLOWER CU. FT./REV.     .644

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                    57.3/3
   HC   SAMPLE   PPM                                     573
   HC   BACKGRD METER READING/SCALE                      2.5/3
   HC   BACKGRD PPM                                       25
   CO   SAMPLE   METER READING/SCALE                    95.1/2
   CO   SAMPLE   PPM                                    4149
   CO   BACKGRD METER READING/SCALE                      2.3/2
   CO   BACKGRD PPM                                       65
   CO2  SAMPLE   METER READING/SCALE                    62.2/2
   CO2  SAMPLE   PERCENT                                1.82
   CO2  BACKGRD METER READING/SCALE                      2.5/2
   CO2  BACKGRD PERCENT                                  .06
   NOX  SAMPLE   METER READING/SCALE                    88.0/2
   NOX  SAMPLE   PPM                                    68.0
   NOX  BACKGRD METER READING/SCALE                      .3/2
   NOX  BACKGRD PPM                                       .3

   HC   CONCENTRATION PPM                               552
   CO   CONCENTRATION PPM                              3873
   CO2  CONCENTRATION PCT                              1.76
   NOX  CONCENTRATION PPM                              87.8
   HC   MASS (GRAMS)                                 114.60
   CO   MASS (GRAMS)                                1622.59
   CO2  MASS (GRAMS)                               11671.04
   NOX  MASS (GRAMS)                                  60.40

HC   GRAMS/MILE  15.83
CO   GRAMS/MILE  224.1
CO2  GRAMS/MILE   1612
NOX  GRAMS/MILE   8.34

HC   GRAMS/LB OF FUEL  10.47      HC   GRAMS/MIN   5.75
CO   GRAMS/LB OF FUEL  148.2      CO   GRAMS/MIN   81.4
CO2  GRAMS/LB OF FUEL   1066      CO2  GRAMS/MIN    585
NOX  GRAMS/LB OF FUEL   5.52      NOX  GRAMS/MIN   3.03


TOTAL CARBON = 3980.28 GRAMS
CARBON BALANCE FUEL WEIGHT = 10.13 LB.
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                        EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                   TRUCK NUMBER  G6

DATE  9/10/74                    TIME  1500 HRS.            TEST NO.  6
MODEL  1968 INTERNATIONAL        DUMP TRUCK                 ENGINE 345 CID V8
DRIVER  GEM                      TEST WT. 18960 LB.         GVW27500 LB.

WET BULB TEMP  75 F              DRY BULB TEMP  87 F        REL. HUM.  57.5 PCT
SPEC. HUM.  *9.4 GRAIN/LB        BARO.  29.02 IN. HG.       MEASURED FUEL 11.02 LB.

  RUN DURATION            22.30 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       130  DEG. F
  BLOWER REVOLUTIONS     25743
  BLOWER CU. FT./REV.     .642

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                       56.7/3
   HC   SAMPLE  PPM                                        567
   HC   BACKGRD METER READING/SCALE                        1.5/3
   HC   BACKGRD PPM                                         15
   CO   SAMPLE  METER READING/SCALE                       92.4/2
   CO   SAMPLE  PPM                                       3969
   CO   BACKGRD METER READING/SCALE                        2.6/3
   CO   BACKGRD PPM                                         39
   CO2  SAMPLE  METER READING/SCALE                       60.0/2
   CO2  SAMPLE  PERCENT                                   1.74
   CO2  BACKGRD METER READING/SCALE                        2.4/2
   CO2  BACKGRD PERCENT                                    .06
   NOX  SAMPLE  METER READING/SCALE                       23.9/3
   NOX  SAMPLE  PPM                                       71.7
   NOX  BACKGRD METER READING/SCALE                        2.9/3
   NOX  BACKGRD PPM                                        8.7

  HC   CONCENTRATION PPM                                   554
  CO   CONCENTRATION PPM                                  3731
  CO2  CONCENTRATION PCT                                  1.69
  NOX  CONCENTRATION PPM                                  64.4
  HC   MASS (GRAMS)                                     127.40
  CO   MASS (GRAMS)                                    1730.95
  CO2  MASS (GRAMS)                                   12385.73
  NOX  MASS (GRAMS)                                      49.09

HC   GRAMS/MILE  17.60
CO   GRAMS/MILE  239.1
CO2  GRAMS/MILE   1711
NOX  GRAMS/MILE   6.78

HC   GRAMS/LB OF FUEL  11.56      HC   GRAMS/MIN   5.71
CO   GRAMS/LB OF FUEL  157.1      CO   GRAMS/MIN   77.6
CO2  GRAMS/LB OF FUEL   1124      CO2  GRAMS/MIN    555
NOX  GRAMS/LB OF FUEL   4.45      NOX  GRAMS/MIN   2.20


TOTAL CARBON = 4232.84 GRAMS
CARBON BALANCE FUEL WEIGHT = 10.78 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  66

DATE  4/11/74                 TIME  1000 HRS.          TEST NO.  7
MODEL  1968 INTERNATIONAL  DUMP TRUCK                  ENGINE 345 CID V8
DRIVER  EMK                   TEST WT. 18960 LB.       GVW27500 LB.

WET BULB TEMP  75 F           DRY BULB TEMP  80 F      REL. HUM.  79.5 PCT
SPEC. HUM.  *6.4 GRAIN/LB  BARO.  29.05 IN. HG.     MEASURED FUEL 10.33 LB.

  RUN DURATION          21.41 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.      108  DEG. F
  BLOWER REVOLUTIONS  24599
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                66.4/3
   HC   SAMPLE   PPM                                 664
   HC   BACKGRD METER READING/SCALE                  1.7/3
   HC   BACKGRD PPM                                   17
   CO   SAMPLE   METER READING/SCALE                46.2/2
   CO   SAMPLE   PPM                                4224
   CO   BACKGRD METER READING/SCALE                  2.5/2
   CO   BACKGRD PPM                                   71
   CO2 SAMPLE   METER READING/SCALE                 53.1/2
   CO2 SAMPLE   PERCENT                              1.51
   CO2 BACKGRD METER READING/SCALE                   2.0/2
   CO2 BACKGRD PERCENT                               .05
   NOX SAMPLE   METER READING/SCALE                 60.0/2
   NOX SAMPLE   PPM                                 60.0
   NOX BACKGRD METER READING/SCALE                   .4/2
   NOX BACKGRD PPM                                    .4

   HC   CONCENTRATION PPM                            650
   CO   CONCENTRATION PPM                           3934
   CO2 CONCENTRATION PCT                            1.47
   NOX CONCENTRATION PPM                            59.7
   HC   MASS (GRAMS)                              149.26
   CO   MASS (GRAMS)                             1825.10
   CO2 MASS (GRAMS)                             10761.18
   NOX MASS (GRAMS)                                45.47

HC   GRAMS/MILE  20.62
CO   GRAMS/MILE  252.1
CO2 GRAMS/MILE   1486
NOX GRAMS/MILE   6.28

HC   GRAMS/LB OF FUEL  14.45      HC   GRAMS/MIN   6.97
CO   GRAMS/LB OF FUEL  176.7      CO   GRAMS/MIN   85.3
CO2 GRAMS/LB OF FUEL   1042       CO2 GRAMS/MIN    503
NOX GRAMS/LB OF FUEL   4.40       NOX GRAMS/MIN   2.12


TOTAL CARBON = 3848.82 GRAMS
CARBON BALANCE FUEL WEIGHT =  4.80 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G6

DATE  9/11/74                   TIME  1045 HRS.          TEST NO.  8
MODEL  1968 INTERNATIONAL  DUMP TRUCK               ENGINE 345 CID V8
DRIVER  RKH                      TEST WT. 18960 LB.      GVW27500 LB.

WET BULB TEMP  75 F             DRY BULB TEMP  82 F     REL. HUM.  72.5 PCT
SPEC. HUM.  *3.1 GRAIN/LB  BARO.  29.02 IN. HG.    MEASURED FUEL  8.99 LB.

  RUN DURATION             19.82 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  13.0  IN. H2O
  BLOWER INLET TEMP.     132  DEG. F
  BLOWER REVOLUTIONS  22592
  BLOWER CU. FT./REV.  .640

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE            54.6/3
   HC   SAMPLE  PPM                             546
   HC   BACKGRD METER READING/SCALE             1.3/4
   HC   BACKGRD PPM                              13
   CO   SAMPLE  METER READING/SCALE            80.2/2
   CO   SAMPLE  PPM                            3222
   CO   BACKGRD METER READING/SCALE             2.1/2
   CO   BACKGRD PPM                              60
   CO2 SAMPLE  METER READING/SCALE             86.9/3
   CO2 SAMPLE  PERCENT                         1.55
   CO2 BACKGRD METER READING/SCALE              4.3/3
   CO2 BACKGRD PERCENT                          .06
   NOX SAMPLE  METER READING/SCALE             70.0/2
   NOX SAMPLE  PPM                             70.0
   NOX BACKGRD METER READING/SCALE               .2/2
   NOX BACKGRD PPM                               .2

   HC   CONCENTRATION PPM                       535
   CO   CONCENTRATION PPM                      3000
   CO2 CONCENTRATION PCT                       1.50
   NOX CONCENTRATION PPM                       69.8
   HC   MASS (GRAMS)                         107.23
   CO   MASS (GRAMS)                        1214.42
   CO2 MASS (GRAMS)                         9567.64
   NOX MASS (GRAMS)                           46.43

HC   GRAMS/MILE  14.81
CO   GRAMS/MILE  167.7
CO2 GRAMS/MILE   1321
NOX GRAMS/MILE   6.41

HC   GRAMS/LB OF FUEL  11.93      HC   GRAMS/MIN   5.41
CO   GRAMS/LB OF FUEL  135.1      CO   GRAMS/MIN   61.3
CO2 GRAMS/LB OF FUEL   1064      CO2 GRAMS/MIN    483
NOX GRAMS/LB OF FUEL   5.16      NOX GRAMS/MIN   2.34


TOTAL CARBON = 3224.82 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.21 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G6

DATE  9/11/74                 TIME  1145 HRS.          TEST NO.  9
MODEL  1968 INTERNATIONAL  DUMP TRUCK                  ENGINE 345 CID V8
DRIVER  RKH                   TEST WT. 18960 LB.       GVW27500 LB.

WET BULB TEMP  76 F           DRY BULB TEMP  84 F      REL. HUM.  69.5 PCT
SPEC. HUM.  *6.0 GRAIN/LB  BARO.  29.02 IN. HG.        MEASURED FUEL  9.80 LB.

  RUN DURATION            19.43 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H20
  BLOWER DIF.  PRESS.     13.0  IN. H20
  BLOWER INLET TEMP.       130  DEG. F
  BLOWER REVOLUTIONS     22508
  BLOWER CU. FT./REV.     .642

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                50.6/3
   HC   SAMPLE  PPM                                 506
   HC   BACKGRD METER READING/SCALE                 2.2/3
   HC   BACKGRD PPM                                  22
   CO   SAMPLE  METER READING/SCALE                91.4/2
   CO   SAMPLE  PPM                                3904
   CO   BACKGRD METER READING/SCALE                 2.4/2
   CO   BACKGRD PPM                                  68
   CO2  SAMPLE  METER READING/SCALE                59.5/2
   CO2  SAMPLE  PERCENT                            1.72
   CO2  BACKGRD METER READING/SCALE                 2.4/2
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                74.0/2
   NOX  SAMPLE  PPM                                74.0
   NOX  BACKGRD METER READING/SCALE                  .4/2
   NOX  BACKGRD PPM                                  .4

   HC   CONCENTRATION PPM                           488
   CO   CONCENTRATION PPM                          3631
   CO2  CONCENTRATION PCT                          1.67
   NOX  CONCENTRATION PPM                          73.7
   HC   MASS (GRAMS)                              97.98
   CO   MASS (GRAMS)                            1473.29
   CO2  MASS (GRAMS)                           10722.96
   NOX  MASS (GRAMS)                              49.10

HC   GRAMS/MILE  13.53
CO   GRAMS/MILE  203.5
CO2  GRAMS/MILE   1481
NOX  GRAMS/MILE   6.78

HC   GRAMS/LB OF FUEL  10.00      HC   GRAMS/MIN   5.04
CO   GRAMS/LB OF FUEL  150.3      CO   GRAMS/MIN   75.8
CO2  GRAMS/LB OF FUEL   1094      CO2  GRAMS/MIN    552
NOX  GRAMS/LB OF FUEL   5.01      NOX  GRAMS/MIN   2.53


TOTAL CARBON = 3643.12 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.27 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G6

DATE  9/11/74                    TIME  1215 HRS.           TEST NO. 10
MODEL  1968 INTERNATIONAL  DUMP TRUCK                ENGINE 345 CID V8
DRIVER  RKH                      TEST WT. 18960 LB.       GVW27500 LB.

WET BULB TEMP  78 F          DRY BULB TEMP  91 F      REL. HUM.  56.2 PCT
SPEC. HUM.  *7.0 GRAIN/LB   BARO.  29.05 IN. HG.     MEASURED FUEL 10.02 LB.

  RUN DURATION            19.81 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  13.0  IN. H2O
  BLOWER INLET TEMP.     132  DEG. F
  BLOWER REVOLUTIONS  23064
  BLOWER CU. FT./REV.  .642

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE               51.3/3
   HC   SAMPLE   PPM                                513
   HC   BACKGRD METER READING/SCALE                 1.3/3
   HC   BACKGRD PPM                                  13
   CO   SAMPLE   METER READING/SCALE               91.8/2
   CO   SAMPLE   PPM                               3930
   CO   BACKGRD METER READING/SCALE                 2.2/2
   CO   BACKGRD PPM                                  62
   CO2  SAMPLE   METER READING/SCALE               61.8/2
   CO2  SAMPLE   PERCENT                           1.80
   CO2  BACKGRD METER READING/SCALE                 3.0/2
   CO2  BACKGRD PERCENT                             .08
   NOX  SAMPLE   METER READING/SCALE               22.0/2
   NOX  SAMPLE   PPM                               22.0
   NOX  BACKGRD METER READING/SCALE                 .9/2
   NOX  BACKGRD PPM                                  .9

   HC   CONCENTRATION PPM                           502
   CO   CONCENTRATION PPM                          3871
   CO2  CONCENTRATION PCT                          1.71
   NOX  CONCENTRATION PPM                          21.2
   HC   MASS (GRAMS)                             103.08
   CO   MASS (GRAMS)                            1521.58
   CO2  MASS (GRAMS)                           11384.77
   NOX  MASS (GRAMS)                              48.79

HC   GRAMS/MILE  14.24
CO   GRAMS/MILE  210.2
CO2  GRAMS/MILE   1572
NOX  GRAMS/MILE   6.74

HC   GRAMS/LB OF FUEL  10.29      HC   GRAMS/MIN   5.20
CO   GRAMS/LB OF FUEL  151.9      CO   GRAMS/MIN   76.8
CO2  GRAMS/LB OF FUEL   1136      CO2  GRAMS/MIN    575
NOX  GRAMS/LB OF FUEL   4.87      NOX  GRAMS/MIN   2.46


TOTAL CARBON = 3848.87 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.80 LB.
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TRUCK G-7

1965 CHEVROLET 19500 LB GVW VAN
WITH 292 CID I6 ENGINE
(8 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G7

DATE  9/18/74                  TIME  1340 HRS.         TEST NO.  1
MODEL  1965 CHEVROLET          BOX VAN                 ENGINE 292 CID I6
DRIVER  EMK                    TEST WT. 14850 LB.      GVW19500 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  93 F     REL. HUM.  48.6 PCT
SPEC. HUM.  *6.1 GRAIN/LB      BARO.  29.20 IN. HG.    MEASURED FUEL  9.66 LB.

  RUN DURATION            19.48 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H20
  BLOWER DIF.  PRESS.     12.5  IN. H20
  BLOWER INLET TEMP.       122  DEG. F
  BLOWER REVOLUTIONS     22656
  BLOWER CU. FT./REV.     .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                88.4/3
   HC   SAMPLE  PPM                                 884
   HC   BACKGRD METER READING/SCALE                 3.2/3
   HC   BACKGRD PPM                                  32
   CO   SAMPLE  METER READING/SCALE                60.2/1
   CO   SAMPLE  PPM                                6809
   CO   BACKGRD METER READING/SCALE                 2.0/2
   CO   BACKGRD PPM                                  57
   CO2  SAMPLE  METER READING/SCALE                64.5/3
   CO2  SAMPLE  PERCENT                            1.08
   CO2  BACKGRD METER READING/SCALE                 4.3/3
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                38.6/2
   NOX  SAMPLE  PPM                                38.6
   NOX  BACKGRD METER READING/SCALE                 1.3/2
   NOX  BACKGRD PPM                                 1.3

   HC   CONCENTRATION PPM                           856
   CO   CONCENTRATION PPM                          6512
   CO2  CONCENTRATION PCT                          1.03
   NOX  CONCENTRATION PPM                          37.5
   HC   MASS (GRAMS)                             177.88
   CO   MASS (GRAMS)                            2730.93
   CO2  MASS (GRAMS)                            6809.11
   NOX  MASS (GRAMS)                              25.82

HC   GRAMS/MILE  24.57
CO   GRAMS/MILE  377.2
CO2  GRAMS/MILE    940
NOX  GRAMS/MILE   3.57

HC   GRAMS/LB OF FUEL  18.41     HC   GRAMS/MIN   9.13
CO   GRAMS/LB OF FUEL  282.7     CO   GRAMS/MIN  140.2
CO2  GRAMS/LB OF FUEL    705     CO2  GRAMS/MIN    350
NOX  GRAMS/LB OF FUEL   2.67     NOX  GRAMS/MIN   1.33


TOTAL CARBON = 3183.44 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.10 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G7

DATE  9/18/74               TIME  1410 HRS.          TEST NO.  2
MODEL  1965 CHEVROLET       BOX VAN                  ENGINE 292 CID I6
DRIVER  EMK                 TEST WT. 14850 LB.       GVW19500 LB.

WET BULB TEMP  77 F         DRY BULB TEMP  87 F      REL. HUM.  63.8 PCT
SPEC. HUM.  *6.5 GRAIN/LB   BARO.  29.20 IN. HG.     MEASURED FUEL  8.65 LB.

  RUN DURATION           21.87 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.    12.5  IN. H20
  BLOWER INLET TEMP.      116  DEG. F
  BLOWER REVOLUTIONS    25449
  BLOWER CU. FT./REV.    .648

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  63.6/3
   HC   SAMPLE  PPM                                   636
   HC   BACKGRD METER READING/SCALE                   2.8/3
   HC   BACKGRD PPM                                    28
   CO   SAMPLE  METER READING/SCALE                  53.0/1
   CO   SAMPLE  PPM                                  5394
   CO   BACKGRD METER READING/SCALE                   1.8/2
   CO   BACKGRD PPM                                    51
   CO2  SAMPLE  METER READING/SCALE                  54.1/3
   CO2  SAMPLE  PERCENT                               .88
   CO2  BACKGRD METER READING/SCALE                   2.6/2
   CO2  BACKGRD PERCENT                               .06
   NOX  SAMPLE  METER READING/SCALE                  32.4/2
   NOX  SAMPLE  PPM                                  32.4
   NOX  BACKGRD METER READING/SCALE                   1.2/2
   NOX  BACKGRD PPM                                   1.2

   HC   CONCENTRATION PPM                             611
   CO   CONCENTRATION PPM                            5147
   CO2  CONCENTRATION PCT                             .82
   NOX  CONCENTRATION PPM                            31.3
   HC   MASS (GRAMS)                               144.33
   CO   MASS (GRAMS)                              2454.26
   CO2  MASS (GRAMS)                              6213.17
   NOX  MASS (GRAMS)                                24.54

HC   GRAMS/MILE  19.93
CO   GRAMS/MILE  339.0
CO2  GRAMS/MILE    858
NOX  GRAMS/MILE   3.39

HC   GRAMS/LB OF FUEL  16.69      HC   GRAMS/MIN   6.60
CO   GRAMS/LB OF FUEL  283.7      CO   GRAMS/MIN  112.2
CO2  GRAMS/LB OF FUEL    718      CO2  GRAMS/MIN    284
NOX  GRAMS/LB OF FUEL   2.84      NOX  GRAMS/MIN   1.12


TOTAL CARBON = 2873.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.31 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  67

DATE  9/18/74                TIME  1500 HRS.          TEST NO.  3
MODEL  1965 CHEVROLET        BOX VAN                  ENGINE 292 CID I6
DRIVER  EMK                  TEST WT. 14850 LB.       GVW19500 LB.

WET BULB TEMP  79 F          DRY BULB TEMP  98 F      REL. HUM.  43.4 PCT
SPEC. HUM.  *0.9 GRAIN/LB    BARO.  29.20 IN. HG.     MEASURED FUEL  8.56 LB.

  RUN DURATION           19.08 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.    12.5  IN. H20
  BLOWER INLET TEMP.      122  DEG. F
  BLOWER REVOLUTIONS    22186
  BLOWER CU. FT./REV.    .646

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  68.2/3
   HC  SAMPLE  PPM                                   682
   HC  BACKGRD METER READING/SCALE                   2.7/3
   HC  BACKGRD PPM                                    27
   CO  SAMPLE  METER READING/SCALE                  54.9/1
   CO  SAMPLE  PPM                                  5739
   CO  BACKGRD METER READING/SCALE                   2.0/2
   CO  BACKGRD PPM                                    57
   CO2 SAMPLE  METER READING/SCALE                  58.1/3
   CO2 SAMPLE  PERCENT                               .96
   CO2 BACKGRD METER READING/SCALE                   3.3/3
   CO2 BACKGRD PERCENT                               .05
   NOX SAMPLE  METER READING/SCALE                  37.3/2
   NOX SAMPLE  PPM                                  37.3
   NOX BACKGRD METER READING/SCALE                   1.4/2
   NOX BACKGRD PPM                                   1.4

   HC  CONCENTRATION PPM                             658
   CO  CONCENTRATION PPM                            5503
   CO2 CONCENTRATION PCT                             .92
   NOX CONCENTRATION PPM                            36.1
   HC  MASS (GRAMS)                               133.88
   CO  MASS (GRAMS)                              2260.11
   CO2 MASS (GRAMS)                              5941.49
   NOX MASS (GRAMS)                                24.33

HC  GRAMS/MILE  18.44
CO  GRAMS/MILE  312.2
CO2 GRAMS/MILE    821
NOX GRAMS/MILE   3.36

HC  GRAMS/LB OF FUEL  15.64     HC  GRAMS/MIN   7.02
CO  GRAMS/LB OF FUEL  264.0     CO  GRAMS/MIN  118.5
CO2 GRAMS/LB OF FUEL    694     CO2 GRAMS/MIN    311
NOX GRAMS/LB OF FUEL   2.84     NOX GRAMS/MIN   1.28


TOTAL CARBON = 2706.65 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.89 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G7

DATE  9/18/74                  TIME  1530 HRS.          TEST NO.  4
MODEL  1965 CHEVROLET          BOX VAN                  ENGINE 292 CID I6
DRIVER  GEM                    TEST WT. 14850 LB.       GVW19500 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  93 F      REL. HUM.  48.6 PCT
SPFC. HUM.  *6.1 GRAIN/LB      BARO.  29.20 IN. HG.     MEASURED FUEL  8.[illegible] LB.

  RUN DURATION            19.84 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     12.5  IN. H2O
  BLOWER INLET TEMP.       130  DEG. F
  BLOWER REVOLUTIONS     23058
  BLOWER CU. FT./REV.     .644

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 72.7/3
   HC   SAMPLE  PPM                                  727
   HC   BACKGRD METER READING/SCALE                  2.9/3
   HC   BACKGRD PPM                                   29
   CO   SAMPLE  METER READING/SCALE                 55.2/1
   CO   SAMPLE  PPM                                 5795
   CO   BACKGRD METER READING/SCALE                  2.0/2
   CO   BACKGRD PPM                                   57
   CO2  SAMPLE  METER READING/SCALE                 60.0/3
   CO2  SAMPLE  PERCENT                              .99
   CO2  BACKGRD METER READING/SCALE                  3.8/3
   CO2  BACKGRD PERCENT                              .05
   NOX  SAMPLE  METER READING/SCALE                 38.0/2
   NOX  SAMPLE  PPM                                 38.0
   NOX  BACKGRD METER READING/SCALE                  1.2/2
   NOX  BACKGRD PPM                                  1.2

   HC   CONCENTRATION PPM                            702
   CO   CONCENTRATION PPM                           5544
   CO2  CONCENTRATION PCT                            .95
   NOX  CONCENTRATION PPM                           36.9
   HC   MASS (GRAMS)                              145.66
   CO   MASS (GRAMS)                             2324.30
   CO2  MASS (GRAMS)                             6264.23
   NOX  MASS (GRAMS)                               25.44

HC  GRAMS/MILE  20.12
CO  GRAMS/MILE  321.0
CO2 GRAMS/MILE    865
NOX GRAMS/MILE   3.51

HC  GRAMS/LB OF FUEL  16.53     HC  GRAMS/MIN   7.34
CO  GRAMS/LB OF FUEL  263.8     CO  GRAMS/MIN  117.1
CO2 GRAMS/LB OF FUEL    711     CO2 GRAMS/MIN    316
NOX GRAMS/LB OF FUEL   2.89     NOX GRAMS/MIN   1.28


TOTAL CARBON = 2832.46 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.21 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G7

DATE  9/18/74                 TIME  1600 HRS.          TEST NO.  5
MODEL  1965 CHEVROLET         BOX VAN                  ENGINE 292 CID I6
DRIVER  GFM                   TEST WT. 14850 LB.       GVW19500 LB.

WET BULB TEMP  77 F           DRY BULB TEMP  95 F      REL. HUM.  44.4 PCT
SPEC. HUM.  *2.6 GRAIN/LB     BARO.  29.20 IN. HG.     MEASURED FUEL  8.02 LB.

  RUN DURATION           19.67 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.    12.5  IN. H20
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS    22705
  BLOWER CU. FT./REV.    .643

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                 75.9/3
   HC   SAMPLE   PPM                                  759
   HC   BACKGRD METER READING/SCALE                   1.5/3
   HC   BACKGRD PPM                                    15
   CO   SAMPLE   METER READING/SCALE                 54.4/1
   CO   SAMPLE   PPM                                 5646
   CO   BACKGRD METER READING/SCALE                   1.6/2
   CO   BACKGRD PPM                                    45
   CO2 SAMPLE   METER READING/SCALE                  58.5/3
   CO2 SAMPLE   PERCENT                               .97
   CO2 BACKGRD METER READING/SCALE                    4.6/3
   CO2 BACKGRD PERCENT                                .07
   NOX SAMPLE   METER READING/SCALE                  38.8/2
   NOX SAMPLE   PPM                                  38.8
   NOX BACKGRD METER READING/SCALE                    1.3/2
   NOX BACKGRD PPM                                    1.3

   HC   CONCENTRATION PPM                             746
   CO   CONCENTRATION PPM                            5421
   CO2 CONCENTRATION PCT                              .91
   NOX CONCENTRATION PPM                             37.7
   HC   MASS (GRAMS)                               152.40
   CO   MASS (GRAMS)                              2236.64
   CO2 MASS (GRAMS)                               5909.97
   NOX MASS (GRAMS)                                 25.52

HC  GRAMS/MILE  21.05
CO  GRAMS/MILE  308.9
CO2 GRAMS/MILE    816
NOX GRAMS/MILE   3.52

HC  GRAMS/LB OF FUEL  19.00       HC  GRAMS/MIN    7.75
CO  GRAMS/LB OF FUEL  278.9       CO  GRAMS/MIN   113.7
CO2 GRAMS/LB OF FUEL    737       CO2 GRAMS/MIN     300
NOX GRAMS/LB OF FUEL   3.18       NOX GRAMS/MIN    1.30


TOTAL CARBON = 2704.02 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.88 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                    TRUCK NUMBER  G7

DATE  9/19/74                  TIME   925 HRS.              TEST NO.  8
MODEL  1965 CHEVROLET          BOX VAN                      ENGINE 292 CID I6
DRIVER  RKH                    TEST WT. 14850 LB.           GVW19500 LB.

WET BULB TEMP  76 F            DRY BULB TEMP  84 F          REL. HUM.  69.5 PCT
SPEC. HUM.  *5.1 GRAIN/LB      BARO.  29.21 IN. HG.         MEASURED FUEL  8.88 LB.

  RUN DURATION            18.31 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       116  DEG. F
  BLOWER REVOLUTIONS     21242
  BLOWER CU. FT./REV.     .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                71.4/3
   HC   SAMPLE  PPM                                 714
   HC   BACKGRD METER READING/SCALE                 3.0/3
   HC   BACKGRD PPM                                  30
   CO   SAMPLE  METER READING/SCALE                56.6/1
   CO   SAMPLE  PPM                                6064
   CO   BACKGRD METER READING/SCALE                 2.4/2
   CO   BACKGRD PPM                                  68
   CO2  SAMPLE  METER READING/SCALE                63.5/3
   CO2  SAMPLE  PERCENT                            1.06
   CO2  BACKGRD METER READING/SCALE                 3.7/3
   CO2  BACKGRD PERCENT                             .05
   NOX  SAMPLE  METER READING/SCALE                38.2/2
   NOX  SAMPLE  PPM                                38.2
   NOX  BACKGRD METER READING/SCALE                 1.1/2
   NOX  BACKGRD PPM                                 1.1

   HC   CONCENTRATION PPM                           688
   CO   CONCENTRATION PPM                          5746
   CO2  CONCENTRATION PCT                          1.02
   NOX  CONCENTRATION PPM                          37.2
   HC   MASS (GRAMS)                             135.41
   CO   MASS (GRAMS)                            2283.76
   CO2  MASS (GRAMS)                            6374.81
   NOX  MASS (GRAMS)                              24.31

HC   GRAMS/MILE  18.70
CO   GRAMS/MILE  315.4
CO2  GRAMS/MILE    880
NOX  GRAMS/MILE   3.36

HC   GRAMS/LB OF FUEL  15.25      HC   GRAMS/MIN   7.40
CO   GRAMS/LB OF FUEL  257.2      CO   GRAMS/MIN  124.8
CO2  GRAMS/LB OF FUEL    718      CO2  GRAMS/MIN    348
NOX  GRAMS/LB OF FUEL   2.74      NOX  GRAMS/MIN   1.33


TOTAL CARBON = 2836.38 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.22 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G7

DATE  9/19/74                  TIME    950 HRS.           TEST NO.  9
MODEL  1965 CHEVROLET          BOX VAN                    ENGINE 292 CID I6
DRIVER  RKH                    TEST WT. 14850 LB.         GVW19500 LB.

WET BULB TEMP  76 F            DRY BULB TEMP  84 F        REL. HUM.  69.5 PCT
SPEC. HUM.  *5.1 GRAIN/LB      BARO.  29.21 IN. HG.       MEASURED FUEL  7.74 LB.

  RUN DURATION              17.48 MINUTES
  BLOWER INLET PRESS.        7.5  IN. H2O
  BLOWER DIF.  PRESS.       13.0  IN. H2O
  BLOWER INLET TEMP.         116  DEG. F
  BLOWER REVOLUTIONS       20199
  BLOWER CU. FT./REV.       .646

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                66.2/3
   HC   SAMPLE   PPM                                 662
   HC   BACKGRD METER READING/SCALE                  2.6/3
   HC   BACKGRD PPM                                   26
   CO   SAMPLE   METER READING/SCALE                54.2/1
   CO   SAMPLE   PPM                                5610
   CO   BACKGRD METER READING/SCALE                  2.5/2
   CO   BACKGRD PPM                                   71
   CO2  SAMPLE   METER READING/SCALE                57.3/3
   CO2  SAMPLE   PERCENT                             .94
   CO2  BACKGRD METER READING/SCALE                  2.2/2
   CO2  BACKGRD PERCENT                              .05
   NOX  SAMPLE   METER READING/SCALE                29.0/2
   NOX  SAMPLE   PPM                                29.0
   NOX  BACKGRD METER READING/SCALE                  1.2/2
   NOX  BACKGRD PPM                                  1.2

   HC   CONCENTRATION PPM                            639
   CO   CONCENTRATION PPM                           5321
   CO2  CONCENTRATION PCT                            .89
   NOX  CONCENTRATION PPM                           27.9
   HC   MASS (GRAMS)                              119.58
   CO   MASS (GRAMS)                             2010.22
   CO2  MASS (GRAMS)                             5736.35
   NOX  MASS (GRAMS)                               17.34

HC   GRAMS/MILE  16.52
CO   GRAMS/MILE  277.7
CO2  GRAMS/MILE    737
NOX  GRAMS/MILE   2.40

HC   GRAMS/LB OF FUEL  15.45     HC   GRAMS/MIN   6.84
CO   GRAMS/LB OF FUEL  259.7     CO   GRAMS/MIN  115.0
CO2  GRAMS/LB OF FUEL    689     CO2  GRAMS/MIN    305
NOX  GRAMS/LB OF FUEL   2.24     NOX  GRAMS/MIN    .99


TOTAL CARBON = 2421.96 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.17 LB.
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                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G7

DATE  9/19/74                  TIME  1035 HRS.            TEST NO. 10
MODEL  1965 CHEVROLET          BOX VAN                    ENGINE 292 CID I6
DRIVER  GEM                    TEST WT. 1*850 LB.         GVW19500 LB.

WET BULB TEMP  77 F            DRY BULB TEMP  85 F        REL. HUM.  69.8 PCT
SPEC. HUM.  *0.0 GRAIN/LB      BARO.  29.20 IN. HG.       MEASURED FUEL  7.53 LB.

  RUN DURATION           17.06 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    12.5  IN. H2O
  BLOWER INLET TEMP.      126  DEG. F
  BLOWER REVOLUTIONS    19683
  BLOWER CU. FT./REV.    .645

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 73.4/3
   HC  SAMPLE  PPM                                 734
   HC  BACKGRD METER READING/SCALE                  2.5/3
   HC  BACKGRD PPM                                  25
   CO  SAMPLE  METER READING/SCALE                 57.1/1
   CO  SAMPLE  PPM                                 6163
   CO  BACKGRD METER READING/SCALE                  2.5/2
   CO  BACKGRD PPM                                  71
   CO2 SAMPLE  METER READING/SCALE                 64.0/3
   CO2 SAMPLE  PERCENT                             1.07
   CO2 BACKGRD METER READING/SCALE                  2.6/2
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE                 36.8/2
   NOX SAMPLE  PPM                                 36.8
   NOX BACKGRD METER READING/SCALE                  1.5/2
   NOX BACKGRD PPM                                  1.5

   HC  CONCENTRATION PPM                          712
   CO  CONCENTRATION PPM                         5836
   CO2 CONCENTRATION PCT                         1.02
   NOX CONCENTRATION PPM                         35.5
   HC  MASS (GRAMS)                            127.50
   CO  MASS (GRAMS)                           2109.37
   CO2 MASS (GRAMS)                           5795.85
   NOX MASS (GRAMS)                             21.07

HC  GRAMS/MILE  17.61
CO  GRAMS/MILE  291.3
CO2 GRAMS/MILE    801
NOX GRAMS/MILE   2.91

HC  GRAMS/LB OF FUEL  16.93     HC  GRAMS/MIN   7.48
CO  GRAMS/LB OF FUEL  280.1     CO  GRAMS/MIN  123.7
CO2 GRAMS/LB OF FUEL    770     CO2 GRAMS/MIN    340
NOX GRAMS/LB OF FUEL   2.80     NOX GRAMS/MIN   1.24


TOTAL CARBON = 2596.74 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.61 LB.
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TRUCK G-8

1965 GMC 19500 LB GVW VAN
WITH 351 CID V6 ENGINE
(9 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G8

DATE 10/ 2/74                 TIME  1250 HRS.          TEST NO.  4
MODEL  1965 GMC               MOVING VAN               ENGINE 351 CID V6
DRIVER  ERK                   TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  64 F           DRY BULB TEMP  82 F      REL. HUM.  36.5 PCT
SPEC. HUM.  60.4 GRAIN/LB     BARO.  29.42 IN. HG.     MEASURED FUEL  9.64 LB.

  RUN DURATION           29.32 MINUTES
  BLOWER INLET PRESS.     8.5  IN. H20
  BLOWER DIF.  PRESS.    14.0  IN. H20
  BLOWER INLET TEMP.       98  DEG. F
  BLOWER REVOLUTIONS  27737
  BLOWER CU. FT./REV.  .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              22.3/4
   HC   SAMPLE  PPM                              2730
   HC   BACKGRD METER READING/SCALE               2.0/4
   HC   BACKGRD PPM                                20
   CO   SAMPLE  METER READING/SCALE              85.8/2
   CO   SAMPLE  PPM                              3552
   CO   BACKGRD METER READING/SCALE                .6/2
   CO   BACKGRD PPM                                17
   CO2 SAMPLE  METER READING/SCALE              52.1/3
   CO2 SAMPLE  PERCENT                            .85
   CO2 BACKGRD METER READING/SCALE               2.8/4
   CO2 BACKGRD PERCENT                            .09
   NOX SAMPLE  METER READING/SCALE              65.0/2
   NOX SAMPLE  PPM                              65.0
   NOX BACKGRD METER READING/SCALE               1.0/2
   NOX BACKGRD PPM                               1.0

   HC   CONCENTRATION PPM                        2712
   CO   CONCENTRATION PPM                        3438
   CO2 CONCENTRATION PCT                          .91
   NOX CONCENTRATION PPM                         64.1
   HC   MASS (GRAMS)                           719.36
   CO   MASS (GRAMS)                          1840.80
   CO2 MASS (GRAMS)                          6880.66
   NOX MASS (GRAMS)                            56.39

HC   GRAMS/MILE   99.36
CO   GRAMS/MILE  254.3
CO2 GRAMS/MILE    950
NOX GRAMS/MILE    7.79

HC   GRAMS/LB OF FUEL   24.62      HC   GRAMS/MIN   27.58
CO   GRAMS/LB OF FUEL  191.0       CO   GRAMS/MIN    75.7
CO2 GRAMS/LB OF FUEL    714       CO2 GRAMS/MIN    283
NOX GRAMS/LB OF FUEL   5.85       NOX GRAMS/MIN   2.32


TOTAL CARBON = 7290.19 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.38 LB.
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                     EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER  G8

DATE 10/ 2/74                 TIME  1356 HRS.           TEST NO.  5
MODEL  1965 GMC               MOVING VAN                ENGINE 351 CID V6
DRIVER  ERK                   TEST WT. 16000 LB.        GVW19500 LB.

WET BULB TEMP  64 F           DRY BULB TEMP  84 F       REL. HUM.  32.4 PCT
SPEC. HUM.  57.0 GRAIN/LB     BARO.  29.92 IN. HG.      MEASURED FUEL  9.00 LB.

  RUN DURATION             22.98 MINUTES
  BLOWER INLET PRESS.       8.5  IN. H2O
  BLOWER DIF.  PRESS.      14.0  IN. H2O
  BLOWER INLET TEMP.        100  DEG. F
  BLOWER REVOLUTIONS     26172
  BLOWER CU. FT./REV.     .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    27.6/4
   HC   SAMPLE  PPM                                    2760
   HC   BACKGRD METER READING/SCALE                     5.7/3
   HC   BACKGRD PPM                                      57
   CO   SAMPLE  METER READING/SCALE                    85.4/2
   CO   SAMPLE  PPM                                    3528
   CO   BACKGRD METER READING/SCALE                      .7/2
   CO   BACKGRD PPM                                      20
   CO2  SAMPLE  METER READING/SCALE                    52.8/3
   CO2  SAMPLE  PERCENT                                 .86
   CO2  BACKGRD METER READING/SCALE                     3.3/3
   CO2  BACKGRD PERCENT                                 .05
   NOX  SAMPLE  METER READING/SCALE                    62.7/2
   NOX  SAMPLE  PPM                                    62.7
   NOX  BACKGRD METER READING/SCALE                      .8/2
   NOX  BACKGRD PPM                                      .8

   HC   CONCENTRATION PPM                              2709
   CO   CONCENTRATION PPM                              3416
   CO2  CONCENTRATION PCT                               .82
   NOX  CONCENTRATION PPM                              62.0
   HC   MASS (GRAMS)                                 675.82
   CO   MASS (GRAMS)                                1720.16
   CO2  MASS (GRAMS)                                6493.45
   NOX  MASS (GRAMS)                                  51.28

HC   GRAMS/MILE   93.35
CO   GRAMS/MILE  237.6
CO2  GRAMS/MILE    842
NOX  GRAMS/MILE   7.08

HC   GRAMS/LB OF FUEL  75.09      HC   GRAMS/MIN  29.41
CO   GRAMS/LB OF FUEL  191.1      CO   GRAMS/MIN   74.8
CO2  GRAMS/LB OF FUEL    721      CO2  GRAMS/MIN    283
NOX  GRAMS/LB OF FUEL   5.70      NOX  GRAMS/MIN   2.23


TOTAL CARBON = 3095.08 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.88 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G8

DATE 10/ 2/74                  TIME  1433 HRS.          TEST NO.  6
MODEL  1965 GMC                MOVING VAN               ENGINE 351 CID V8
DRIVER  ERK                    TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  66 F            DRY BULB TEMP  88 F      REL. HUM.  30.1 PCT
SPEC. HUM.  60.2 GRAIN/LB   BARO.  29.42 IN. HG.     MEASURED FUEL  9.48 LB.

  RUN DURATION            23.90 MINUTES
  BLOWER INLET PRESS.      8.5  IN. H2O
  BLOWER DIF.  PRESS.     14.0  IN. H2O
  BLOWER INLET TEMP.       102  DEG. F
  BLOWER REVOLUTIONS     27194
  BLOWER CU. FT./REV.     .643

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                        27.3/4
   HC  SAMPLE  PPM                                        2730
   HC  BACKGRD METER READING/SCALE                         4.8/3
   HC  BACKGRD PPM                                          48
   CO  SAMPLE  METER READING/SCALE                        85.7/2
   CO  SAMPLE  PPM                                        3546
   CO  BACKGRD METER READING/SCALE                          .7/2
   CO  BACKGRD PPM                                         20
   CO2 SAMPLE  METER READING/SCALE                        52.6/3
   CO2 SAMPLE  PERCENT                                     .86
   CO2 BACKGRD METER READING/SCALE                         1.7/3
   CO2 BACKGRD PERCENT                                     .02
   NOX SAMPLE  METER READING/SCALE                        61.7/2
   NOX SAMPLE  PPM                                        61.7
   NOX BACKGRD METER READING/SCALE                          .8/2
   NOX BACKGRD PPM                                          .8

   HC  CONCENTRATION PPM                                 2687
   CO  CONCENTRATION PPM                                 3436
   CO2 CONCENTRATION PCT                                  .83
   NOX CONCENTRATION PPM                                 61.0
   HC  MASS (GRAMS)                                     694.21
   CO  MASS (GRAMS)                                    1792.19
   CO2 MASS (GRAMS)                                    6864.05
   NOX MASS (GRAMS)                                      52.25

HC  GRAMS/MILE   95.89
CO  GRAMS/MILE  247.5
CO2 GRAMS/MILE    948
NOX GRAMS/MILE   7.22

HC  GRAMS/LB OF FUEL   73.23      HC  GRAMS/MIN  29.05
CO  GRAMS/LB OF FUEL  189.0       CO  GRAMS/MIN   75.0
CO2 GRAMS/LB OF FUEL    724       CO2 GRAMS/MIN   287
NOX GRAMS/LB OF FUEL   5.51       NOX GRAMS/MIN   2.19


TOTAL CARBON = 3243.03 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.26 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G8

DATE 10/ 2/74              TIME  1600 HRS.          TEST NO.  8
MODEL  1965 GMC            MOVING VAN               ENGINE 351 CID V8
DRIVER  GEM                TEST WT. 16000 LB.       GVW14500 LB.

WET BULB TEMP  68 F        DRY BULB TEMP  88 F      REL. HUM.  35.3 PCT
SPEC. HUM.  71.2 GRAIN/LB  BARO.  29.24 IN. HG.     MEASURED FUEL  9.85 LB.

  RUN DURATION            21.77 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.    14.0  IN. H2O
  BLOWER INLET TEMP.       98  DEG. F
  BLOWER REVOLUTIONS  24812
  BLOWER CU. FT./REV.   .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               31.1/4
   HC   SAMPLE  PPM                               3110
   HC   BACKGRD METER READING/SCALE                5.4/3
   HC   BACKGRD PPM                                 54
   CO   SAMPLE  METER READING/SCALE               90.8/2
   CO   SAMPLE  PPM                               3865
   CO   BACKGRD METER READING/SCALE                 .8/2
   CO   BACKGRD PPM                                 23
   CO2  SAMPLE  METER READING/SCALE               55.7/3
   CO2  SAMPLE  PERCENT                             .91
   CO2  BACKGRD METER READING/SCALE                3.7/3
   CO2  BACKGRD PERCENT                             .05
   NOX  SAMPLE  METER READING/SCALE               55.1/2
   NOX  SAMPLE  PPM                               55.1
   NOX  BACKGRD METER READING/SCALE                1.1/2
   NOX  BACKGRD PPM                                1.1

   HC   CONCENTRATION PPM                         3062
   CO   CONCENTRATION PPM                         3734
   CO2  CONCENTRATION PCT                          .87
   NOX  CONCENTRATION PPM                         54.1
   HC   MASS (GRAMS)                            722.77
   CO   MASS (GRAMS)                           1779.20
   CO2  MASS (GRAMS)                           6514.86
   NOX  MASS (GRAMS)                             42.37

HC   GRAMS/MILE   99.83
CO   GRAMS/MILE  245.7
CO2  GRAMS/MILE    900
NOX  GRAMS/MILE    5.85

HC   GRAMS/LB OF FUEL  73.38      HC   GRAMS/MIN  33.20
CO   GRAMS/LB OF FUEL  180.6      CO   GRAMS/MIN   81.7
CO2  GRAMS/LB OF FUEL    661      CO2  GRAMS/MIN    299
NOX  GRAMS/LB OF FUEL   4.30      NOX  GRAMS/MIN   1.95


TOTAL CARBON = 3166.90 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.06 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G8

DATE 10/ 3/74                  TIME    920 HRS.          TEST NO.  9
MODEL  1965 GMC                MOVING VAN                ENGINE 351 CID V6
DRIVER  GEM                    TEST WT. 16000 LB.        GVW19500 LB.

WET BULB TEMP  63 F            DRY BULB TEMP  68 F       REL. HUM.  76.0 PCT
SPEC. HUM.  78.9 GRAIN/LB  BARO.  29.48 IN. HG.      MEASURED FUEL  9.48 LB.

  RUN DURATION          21.75 MINUTES
  BLOWER INLET PRESS.    8.5  IN. H2O
  BLOWER DIF.  PRESS.   14.0  IN. H2O
  BLOWER INLET TEMP.      90  DEG. F
  BLOWER REVOLUTIONS  24796
  BLOWER CU. FT./REV.  .642

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                   30.5/4
   HC   SAMPLE   PPM                                   3050
   HC   BACKGRD  METER READING/SCALE                    3.3/3
   HC   BACKGRD  PPM                                     33
   CO   SAMPLE   METER READING/SCALE                   91.0/2
   CO   SAMPLE   PPM                                   3828
   CO   BACKGRD  METER READING/SCALE                     .9/2
   CO   BACKGRD  PPM                                     25
   CO2  SAMPLE   METER READING/SCALE                   51.5/3
   CO2  SAMPLE   PERCENT                                .83
   CO2  BACKGRD  METER READING/SCALE                    2.2/3
   CO2  BACKGRD  PERCENT                                .03
   NOX  SAMPLE   METER READING/SCALE                   53.0/2
   NOX  SAMPLE   PPM                                   53.0
   NOX  BACKGRD  METER READING/SCALE                    1.6/2
   NOX  BACKGRD  PPM                                    1.6

   HC   CONCENTRATION PPM                              3021
   CO   CONCENTRATION PPM                              3699
   CO2  CONCENTRATION PCT                               .81
   NOX  CONCENTRATION PPM                              51.6
   HC   MASS (GRAMS)                                 726.45
   CO   MASS (GRAMS)                                1795.92
   CO2  MASS (GRAMS)                                6186.04
   NOX  MASS (GRAMS)                                  41.14

HC   GRAMS/MILE 100.34
CO   GRAMS/MILE  248.1
CO2  GRAMS/MILE    854
NOX  GRAMS/MILE   5.68

HC   GRAMS/LB OF FUEL  76.63      HC   GRAMS/MIN  33.40
CO   GRAMS/LB OF FUEL  189.4      CO   GRAMS/MIN   82.6
CO2  GRAMS/LB OF FUEL    653      CO2  GRAMS/MIN    284
NOX  GRAMS/LB OF FUEL   4.34      NOX  GRAMS/MIN   1.89


TOTAL CARBON = 3087.53 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.86 LB.
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                       EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  GR

DATE 10/ 3/74                 TIME    951 HRS.         TEST NO. 10
MODEL  1965 GMC               MOVING VAN               ENGINE 351 CID V8
DRIVER  GFM                   TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  67 F           DRY BULB TEMP  74 F      REL. HUM.  69.7 PCT
SPEC. HUM.  88.8 GRAIN/LB     BARO.  29.48 IN. HG.     MEASURED FUEL  9.46 LB.

  RUN DURATION              24.65 MINUTES
  BLOWER INLET PRESS.    8.5  IN. H2O
  BLOWER DIF.  PRESS.   13.5  IN. H2O
  BLOWER INLET TEMP.      90  DEG. F
  BLOWER REVOLUTIONS  28258
  BLOWER CU. FT./REV.  .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    25.9/4
   HC   SAMPLE  PPM                                    2590
   HC   BACKGRD METER READING/SCALE                     3.4/3
   HC   BACKGRD PPM                                      34
   CO   SAMPLE  METER READING/SCALE                    81.9/2
   CO   SAMPLE  PPM                                    3320
   CO   BACKGRD METER READING/SCALE                      .7/2
   CO   BACKGRD PPM                                      20
   CO2  SAMPLE  METER READING/SCALE                    46.7/3
   CO2  SAMPLE  PERCENT                                  .75
   CO2  BACKGRD METER READING/SCALE                     1.1/3
   CO2  BACKGRD PERCENT                                  .02
   NOX  SAMPLE  METER READING/SCALE                    50.3/2
   NOX  SAMPLE  PPM                                    50.3
   NOX  BACKGRD METER READING/SCALE                      .7/2
   NOX  BACKGRD PPM                                      .7

   HC   CONCENTRATION PPM                              2559
   CO   CONCENTRATION PPM                              3180
   CO2  CONCENTRATION PCT                               .73
   NOX  CONCENTRATION PPM                              49.7
   HC   MASS (GRAMS)                                 702.87
   CO   MASS (GRAMS)                                1763.25
   CO2  MASS (GRAMS)                                6423.14
   NOX  MASS (GRAMS)                                  45.24

HC   GRAMS/MILE   97.08
CO   GRAMS/MILE  243.5
CO2  GRAMS/MILE    887
NOX  GRAMS/MILE   6.25

HC   GRAMS/LB OF FUEL  74.30      HC   GRAMS/MIN  28.51
CO   GRAMS/LB OF FUEL  186.4      CO   GRAMS/MIN   71.5
CO2  GRAMS/LB OF FUEL    679      CO2  GRAMS/MIN    261
NOX  GRAMS/LB OF FUEL   4.78      NOX  GRAMS/MIN   1.83


TOTAL CARBON = 3117.79 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.94 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  GR

DATE 10/ 3/79                TIME  1041 HRS.          TEST NO. 11
MODEL  1965 GMC              MOVING VAN               ENGINE 351 CID V6
DRIVER  GEA                  TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  68 F          DRY BULB TEMP  76 F      REL. HUM.  66.5 PCT
SPEC. HUM.  90.6 GRAINS/LB   BARO.  29.48 IN. HG.     MEASURED FUEL  9.64 LB.

  RUN DURATION           23.93 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.    13.5  IN. H2O
  BLOWER INLET TEMP.       90  DEG. F
  BLOWER REVOLUTIONS  22911
  BLOWER CU. FT./REV.   .693

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                29.0/4
   HC  SAMPLE  PPM                                2900
   HC  BACKGRD METER READING/SCALE                 4.2/3
   HC  BACKGRD PPM                                  42
   CO  SAMPLE  METER READING/SCALE                88.9/2
   CO  SAMPLE  PPM                                3799
   CO  BACKGRD METER READING/SCALE                 1.5/2
   CO  BACKGRD PPM                                  42
   CO2 SAMPLE  METER READING/SCALE                51.3/4
   CO2 SAMPLE  PERCENT                             .83
   CO2 BACKGRD METER READING/SCALE                 .3/3
   CO2 BACKGRD PERCENT                             .00
   NOX SAMPLE  METER READING/SCALE                50.6/2
   NOX SAMPLE  PPM                                50.6
   NOX BACKGRD METER READING/SCALE                 .2/2
   NOX BACKGRD PPM                                  .2

   HC  CONCENTRATION PPM                          2858
   CO  CONCENTRATION PPM                          3567
   CO2 CONCENTRATION PCT                           .83
   NOX CONCENTRATION PPM                          50.0
   HC  MASS (GRAMS)                             762.38
   CO  MASS (GRAMS)                            1921.05
   CO2 MASS (GRAMS)                            7036.22
   NOX MASS (GRAMS)                              44.21

HC  GRAMS/MILE 105.30
CO  GRAMS/MILE  265.3
CO2 GRAMS/MILE    972
NOX GRAMS/MILE   6.11

HC  GRAMS/LB OF FUEL  79.09      HC  GRAMS/MIN  31.86
CO  GRAMS/LB OF FUEL  199.3      CO  GRAMS/MIN   80.3
CO2 GRAMS/LB OF FUEL    730      CO2 GRAMS/MIN    294
NOX GRAMS/LB OF FUEL   4.59      NOX GRAMS/MIN   1.85


TOTAL CARBON = 3909.32 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.67 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                          TRUCK NUMBER  68

DATE 10/ 3/79                TIME  1115 HRS.          TEST NO. 12
MODEL  1965 GMC              MOVING VAN               ENGINE 351 CID V8
DRIVER  RKH                  TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  67 F          DRY BULB TEMP  78 F      REL. HUM.  63.6 PCT
SPEC. HUM.  92.6 GRAIN/LB    BARO.  29.[illegible]8 IN. HG.     MEASURED FUEL  9.62 LB.

  RUN DURATION            22.71 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.5  IN. H2O
  BLOWER INLET TEMP.        90  DEG. F
  BLOWER REVOLUTIONS  26015
  BLOWER CU. FT./REV.   .693

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                  29.9/4
   HC   SAMPLE   PPM                                  2990
   HC   BACKGRD METER READING/SCALE                    3.9/3
   HC   BACKGRD PPM                                     39
   CO   SAMPLE   METER READING/SCALE                  84.5/2
   CO   SAMPLE   PPM                                  3479
   CO   BACKGRD METER READING/SCALE                     .6/2
   CO   BACKGRD PPM                                     17
   CO2 SAMPLE   METER READING/SCALE                   56.1/3
   CO2 SAMPLE   PERCENT                                .92
   CO2 BACKGRD METER READING/SCALE                     2.1/3
   CO2 BACKGRD PERCENT                                 .03
   NOX SAMPLE   METER READING/SCALE                   68.0/2
   NOX SAMPLE   PPM                                   68.0
   NOX BACKGRD METER READING/SCALE                      .8/2
   NOX BACKGRD PPM                                      .8

   HC   CONCENTRATION PPM                             2956
   CO   CONCENTRATION PPM                             3326
   CO2 CONCENTRATION PCT                               .89
   NOX CONCENTRATION PPM                              67.3
   HC   MASS (GRAMS)                                749.19
   CO   MASS (GRAMS)                               1702.37
   CO2 MASS (GRAMS)                                7222.32
   NOX MASS (GRAMS)                                  56.57

HC   GRAMS/MILE 103.48
CO   GRAMS/MILE  235.1
CO2 GRAMS/MILE    998
NOX GRAMS/MILE   7.81

HC   GRAMS/LB OF FUEL  77.88      HC   GRAMS/MIN  32.99
CO   GRAMS/LB OF FUEL  177.0      CO   GRAMS/MIN   75.0
CO2 GRAMS/LB OF FUEL    751       CO2 GRAMS/MIN    318
NOX GRAMS/LB OF FUEL   5.88       NOX GRAMS/MIN   2.49


TOTAL CARBON = 3349.70 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.53 LB.
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              EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                          TRUCK NUMBER  G8

DATE 10/ 3/74                 TIME  1300 HRS.          TEST NO. 19
MODEL  1965 GMC               MOVING VAN               ENGINE 351 CID V8
DRIVER  RKH                   TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  69 F           DRY BULB TEMP  81 F      REL. HUM.  54.5 PCT
SPEC. HUM.  87.5 GRAINS/LB    BARO.  29.48 IN. HG.     MEASURED FUEL  9.56 LB.

  RUN DURATION           22.71 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   13.5  IN. H2O
  BLOWER INLET TEMP.     100  DEG. F
  BLOWER REVOLUTIONS  26024
  BLOWER CU. FT./REV.  .645

  RAW RESULTS
   HC  SAMPLE  METER READING/SCALE                 31.3/4
   HC  SAMPLE  PPM                                 3130
   HC  BACKGRD METER READING/SCALE                  2.8/3
   HC  BACKGRD PPM                                  28
   CO  SAMPLE  METER READING/SCALE                 92.1/2
   CO  SAMPLE  PPM                                 3950
   CO  BACKGRD METER READING/SCALE                   .8/2
   CO  BACKGRD PPM                                  23
   CO2 SAMPLE  METER READING/SCALE                 58.6/3
   CO2 SAMPLE  PERCENT                              .92
   CO2 BACKGRD METER READING/SCALE                  3.5/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                 65.2/2
   NOX SAMPLE  PPM                                 65.2
   NOX BACKGRD METER READING/SCALE                  1.0/2
   NOX BACKGRD PPM                                  1.0

   HC  CONCENTRATION PPM                           3105
   CO  CONCENTRATION PPM                           3787
   CO2 CONCENTRATION PCT                            .92
   NOX CONCENTRATION PPM                           64.3
   HC  MASS (GRAMS)                              775.80
   CO  MASS (GRAMS)                             1910.18
   CO2 MASS (GRAMS)                             7354.97
   NOX MASS (GRAMS)                               53.30

HC  GRAMS/MILE  107.15
CO  GRAMS/MILE  263.8
CO2 GRAMS/MILE   1016
NOX GRAMS/MILE   7.36

HC  GRAMS/LB OF FUEL  81.15      HC  GRAMS/MIN  34.15
CO  GRAMS/LB OF FUEL  199.8      CO  GRAMS/MIN   84.1
CO2 GRAMS/LB OF FUEL    769      CO2 GRAMS/MIN    324
NOX GRAMS/LB OF FUEL   5.57      NOX GRAMS/MIN   2.35


TOTAL CARBON = 3998.26 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.91 LB.
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TRUCK G-9

1966 CHEVROLET 34000 LB GCW TRACTOR
WITH 366 CID V8 ENGINE
(9 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G9

DATE 10/ 9/74              TIME   950 HRS.          TEST NO.  1
MODEL  1966 CHEVROLET      TRACTOR                  ENGINE 366 CID V8
DRIVER  EMK                TEST WT. 22700 LB.       GVW34000 LB.

WET BULB TEMP  65 F        DRY BULB TEMP  73 F      REL. HUM.  65.3 PCT
SPEC. HUM.  80.7 GRAIN/LB  BARO.  29.34 IN. HG.     MEASURED FUEL  8.76 LB.

  RUN DURATION           22.33 MINUTES
  BLOWER INLET PRESS.    8.0  IN. H2O
  BLOWER DIF.  PRESS.   14.0  IN. H2O
  BLOWER INLET TEMP.     110  DEG. F
  BLOWER REVOLUTIONS  25646
  BLOWER CU. FT./REV.  .644

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE             25.4/4
   HC  SAMPLE  PPM                             2540
   HC  BACKGRD METER READING/SCALE              1.0/3
   HC  BACKGRD PPM                               10
   CO  SAMPLE  METER READING/SCALE             69.2/2
   CO  SAMPLE  PPM                             2626
   CO  BACKGRD METER READING/SCALE               .4/2
   CO  BACKGRD PPM                               11
   CO2 SAMPLE  METER READING/SCALE             66.9/3
   CO2 SAMPLE  PERCENT                         1.13
   CO2 BACKGRD METER READING/SCALE              3.3/3
   CO2 BACKGRD PERCENT                          .05
   NOX SAMPLE  METER READING/SCALE             38.3/3
   NOX SAMPLE  PPM                            114.9
   NOX BACKGRD METER READING/SCALE               .2/3
   NOX BACKGRD PPM                               .6

   HC  CONCENTRATION PPM                       2531
   CO  CONCENTRATION PPM                       2504
   CO2 CONCENTRATION PCT                       1.09
   NOX CONCENTRATION PPM                      114.4
   HC  MASS (GRAMS)                          608.07
   CO  MASS (GRAMS)                         1214.44
   CO2 MASS (GRAMS)                         8329.52
   NOX MASS (GRAMS)                           91.12

HC  GRAMS/MILE  83.99
CO  GRAMS/MILE  167.7
CO2 GRAMS/MILE   1150
NOX GRAMS/MILE  12.59

HC  GRAMS/LB OF FUEL  69.41     HC  GRAMS/MIN  27.23
CO  GRAMS/LB OF FUEL  138.6     CO  GRAMS/MIN   54.4
CO2 GRAMS/LB OF FUEL    951     CO2 GRAMS/MIN    373
NOX GRAMS/LB OF FUEL  10.40     NOX GRAMS/MIN   4.08


TOTAL CARBON = 3320.64 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.45 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G4

DATE 10/ 9/74                TIME  1020 HRS.            TEST NO.  2
MODEL  1966 CHEVROLET        TRACTOR                    ENGINE 366 CID V8
DRIVER  EKK                  TEST WT. 22700 LB.         GVW34000 LB.

WET BULB TEMP  66 F          DRY BULB TEMP  77 F        REL. HUM.  55.9 PCT
SPEC. HUM.  79.0 GRAIN/LB    BARO.  29.34 IN. HG.       MEASURED FUEL  9.86 LB.

  RUN DURATION           23.77 MINUTES
  BLOWER INLET PRESS.    8.0  IN. H20
  BLOWER DIF.  PRESS.   14.0  IN. H20
  BLOWER INLET TEMP.     112  DEG. F
  BLOWER REVOLUTIONS  27312
  BLOWER CU. FT./REV.   .644

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 27.0/4
   HC   SAMPLE  PPM                                 2700
   HC   BACKGRD METER READING/SCALE                  1.8/3
   HC   BACKGRD PPM                                   18
   CO   SAMPLE  METER READING/SCALE                 68.2/2
   CO   SAMPLE  PPM                                 2575
   CO   BACKGRD METER READING/SCALE                   .3/2
   CO   BACKGRD PPM                                    8
   CO2 SAMPLE  METER READING/SCALE                  66.4/3
   CO2 SAMPLE  PERCENT                              1.12
   CO2 BACKGRD METER READING/SCALE                   3.5/3
   CO2 BACKGRD PERCENT                               .05
   NOX SAMPLE  METER READING/SCALE                  35.9/3
   NOX SAMPLE  PPM                                 107.7
   NOX BACKGRD METER READING/SCALE                    .3/3
   NOX BACKGRD PPM                                    .9

   HC   CONCENTRATION PPM                           2684
   CO   CONCENTRATION PPM                           2466
   CO2 CONCENTRATION PCT                            1.07
   NOX CONCENTRATION PPM                           106.9
   HC   MASS (GRAMS)                              684.36
   CO   MASS (GRAMS)                             1269.34
   CO2 MASS (GRAMS)                              8738.87
   NOX MASS (GRAMS)                                90.40

HC   GRAMS/MILE  94.53
CO   GRAMS/MILE  175.3
CO2 GRAMS/MILE   1207
NOX GRAMS/MILE  12.49

HC   GRAMS/LB OF FUEL  69.41      HC   GRAMS/MIN  28.79
CO   GRAMS/LB OF FUEL  128.7      CO   GRAMS/MIN   53.4
CO2 GRAMS/LB OF FUEL    886      CO2 GRAMS/MIN    368
NOX GRAMS/LB OF FUEL   9.17      NOX GRAMS/MIN   3.80


TOTAL CARBON = 3521.98 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.97 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G9

DATE 10/ 9/74               TIME  1117 HRS.           TEST NO.  3
MODEL  1966 CHEVROLET       TRACTOR                   ENGINE 366 CID V8
DRIVER  ERK                 TEST WT. 22700 LB.        GVW34000 LB.

WET BULB TEMP  68 F         DRY BULB TEMP  80 F       REL. HUM.  54.1 PCT
SPFC. HUM.  84.4 GRAIN/LB  BARO.  29.34 IN. HG.     MEASURED FUEL  9.55 LB.

  RUN DURATION           24.47 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.    13.5  IN. H2O
  BLOWER INLET TEMP.      115  DEG. F
  BLOWER REVOLUTIONS  28116
  BLOWER CU. FT./REV.   .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               25.2/4
   HC   SAMPLE  PPM                               2520
   HC   BACKGRD METER READING/SCALE                1.5/3
   HC   BACKGRD PPM                                 15
   CO   SAMPLE  METER READING/SCALE               67.3/2
   CO   SAMPLE  PPM                               2530
   CO   BACKGRD METER READING/SCALE                 .3/2
   CO   BACKGRD PPM                                  8
   CO2  SAMPLE  METER READING/SCALE               66.7/3
   CO2  SAMPLE  PERCENT                           1.13
   CO2  BACKGRD METER READING/SCALE                3.6/3
   CO2  BACKGRD PERCENT                            .05
   NOX  SAMPLE  METER READING/SCALE               38.7/3
   NOX  SAMPLE  PPM                              116.1
   NOX  BACKGRD METER READING/SCALE                 .3/3
   NOX  BACKGRD PPM                                 .9

   HC   CONCENTRATION PPM                         2507
   CO   CONCENTRATION PPM                         2424
   CO2  CONCENTRATION PCT                         1.08
   NOX  CONCENTRATION PPM                        115.3
   HC   MASS (GRAMS)                            655.14
   CO   MASS (GRAMS)                           1278.79
   CO2  MASS (GRAMS)                           8996.25
   NOX  MASS (GRAMS)                             99.95

HC   GRAMS/MILE  90.49
CO   GRAMS/MILE  176.6
CO2  GRAMS/MILE   1243
NOX  GRAMS/MILE  13.80

HC   GRAMS/LB OF FUEL  68.60      HC   GRAMS/MIN  26.77
CO   GRAMS/LB OF FUEL  133.9      CO   GRAMS/MIN   52.3
CO2  GRAMS/LB OF FUEL    942      CO2  GRAMS/MIN    368
NOX  GRAMS/LB OF FUEL  10.47      NOX  GRAMS/MIN   4.08


TOTAL CARBON = 3570.97 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.09 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G9

DATE 10/ 9/74               TIME  1220 HRS.          TEST NO.  4
MODEL  1966 CHEVROLET       TRACTOR                  ENGINE 366 CID V8
DRIVER  GEM                 TEST WT. 22700 LB.       GVW34000 LB.

WET BULB TEMP  69 F         DRY BULB TEMP  84 F      REL. HUM.  46.7 PCT
SPEC. HUM.  83.0 GRAIN/LB  BARO.  29.34 IN. HG.     MEASURED FUEL  8.47 LB.

  RUN DURATION            20.31 MINUTES
  BLOWER INLET PRESS.   8.0  IN. H2O
  BLOWER DIF.  PRESS.  14.0  IN. H2O
  BLOWER INLET TEMP.    120  DEG. F
  BLOWER REVOLUTIONS  23336
  BLOWER CU. FT./REV.  .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               25.9/4
   HC   SAMPLE  PPM                               2590
   HC   BACKGRD METER READING/SCALE                2.3/3
   HC   BACKGRD PPM                                 23
   CO   SAMPLE  METER READING/SCALE               77.9/2
   CO   SAMPLE  PPM                               3091
   CO   BACKGRD METER READING/SCALE                .3/2
   CO   BACKGRD PPM                                  8
   CO2 SAMPLE  METER READING/SCALE                67.1/3
   CO2 SAMPLE  PERCENT                            1.13
   CO2 BACKGRD METER READING/SCALE                 2.0/3
   CO2 BACKGRD PERCENT                             .03
   NOX SAMPLE  METER READING/SCALE                34.5/3
   NOX SAMPLE  PPM                               103.5
   NOX BACKGRD METER READING/SCALE                  .4/3
   NOX BACKGRD PPM                                 1.2

   HC   CONCENTRATION PPM                          2570
   CO   CONCENTRATION PPM                          2970
   CO2 CONCENTRATION PCT                           1.11
   NOX CONCENTRATION PPM                          102.5
   HC   MASS (GRAMS)                             550.97
   CO   MASS (GRAMS)                            1285.61
   CO2 MASS (GRAMS)                             7574.86
   NOX MASS (GRAMS)                               72.85

HC   GRAMS/MILE  76.10
CO   GRAMS/MILE  177.6
CO2 GRAMS/MILE   1046
NOX GRAMS/MILE  10.06

HC   GRAMS/LB OF FUEL  65.05     HC   GRAMS/MIN  27.13
CO   GRAMS/LB OF FUEL  151.8     CO   GRAMS/MIN   63.3
CO2 GRAMS/LB OF FUEL    894     CO2 GRAMS/MIN    373
NOX GRAMS/LB OF FUEL   8.60     NOX GRAMS/MIN   3.59


TOTAL CARBON = 3095.75 GRAMS
CARBON BALANCE FUEL WEIGHT =  7.86 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER  G9

DATE 10/ 9/74                     TIME  1300 HRS.           TEST NO.  5
MODEL  1966 CHEVROLET             TRACTOR                   ENGINE 366 CID V8
DRIVER  GEM                       TEST WT. 22700 LB.        GVW34000 LB.

WET BULB TEMP  68 F               DRY BULB TEMP  84 F       REL. HUM.  43.7 PCT
SPEC. HUM.  77.6 GRAIN/LB         BARO.  29.34 IN. HG.      MEASURED FUEL  8.83 LB.

  RUN DURATION          24.69 MINUTES
  BLOWER INLET PRESS.    8.0  IN. H2O
  BLOWER DIF.  PRESS.   14.0  IN. H2O
  BLOWER INLET TEMP.     110  DEG. F
  BLOWER REVOLUTIONS   28369
  BLOWER CU. FT./REV.   .644

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE            21.4/4
   HC  SAMPLE  PPM                            2140
   HC  BACKGRD METER READING/SCALE             5.1/3
   HC  BACKGRD PPM                              51
   CO  SAMPLE  METER READING/SCALE            70.8/2
   CO  SAMPLE  PPM                            2709
   CO  BACKGRD METER READING/SCALE              .2/2
   CO  BACKGRD PPM                               6
   CO2 SAMPLE  METER READING/SCALE            62.0/3
   CO2 SAMPLE  PERCENT                        1.03
   CO2 BACKGRD METER READING/SCALE             4.3/3
   CO2 BACKGRD PERCENT                         .06
   NOX SAMPLE  METER READING/SCALE            33.0/3
   NOX SAMPLE  PPM                            99.0
   NOX BACKGRD METER READING/SCALE              .6/3
   NOX BACKGRD PPM                             1.8

   HC  CONCENTRATION PPM                      2095
   CO  CONCENTRATION PPM                      2612
   CO2 CONCENTRATION PCT                       .98
   NOX CONCENTRATION PPM                      97.4
   HC  MASS (GRAMS)                         556.66
   CO  MASS (GRAMS)                        1401.16
   CO2 MASS (GRAMS)                        8285.06
   NOX MASS (GRAMS)                          85.85

HC  GRAMS/MILE  76.89
CO  GRAMS/MILE  193.5
CO2 GRAMS/MILE   1144
NOX GRAMS/MILE  11.86

HC  GRAMS/LB OF FUEL  63.04      HC  GRAMS/MIN  22.54
CO  GRAMS/LB OF FUEL  158.7      CO  GRAMS/MIN   56.7
CO2 GRAMS/LB OF FUEL    938      CO2 GRAMS/MIN    336
NOX GRAMS/LB OF FUEL   9.72      NOX GRAMS/MIN   3.48

TOTAL CARBON = 3344.06 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.51 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G9

DATE 10/ 9/74                 TIME  1340 HRS.            TEST NO.  6
MODEL  1966 CHEVROLET         TRACTOR                    ENGINE 366 CID V8
DRIVER  GEM                   TEST WT. 22700 LB.         GVW=34000 LB.

WET BULB TEMP  68 F           DRY BULB TEMP  83 F        REL. HUM.  46.1 PCT
SPEC. HUM.  79.2 GRAIN/LB     BARO.  29.36 IN. HG.       MEASURED FUEL  9.02 LB.

  RUN DURATION           22.92 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.    14.0  IN. H2O
  BLOWER INLET TEMP.      120  DEG. F
  BLOWER REVOLUTIONS   26335
  BLOWER CU. FT./REV.   .643

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   23.3/4
   HC   SAMPLE  PPM                                   2330
   HC   BACKGRD METER READING/SCALE                    2.0/3
   HC   BACKGRD PPM                                     20
   CO   SAMPLE  METER READING/SCALE                   72.8/2
   CO   SAMPLE  PPM                                   2814
   CO   BACKGRD METER READING/SCALE                     .2/2
   CO   BACKGRD PPM                                      6
   CO2  SAMPLE  METER READING/SCALE                   63.6/3
   CO2  SAMPLE  PERCENT                               1.06
   CO2  BACKGRD METER READING/SCALE                    2.0/3
   CO2  BACKGRD PERCENT                                .03
   NOX  SAMPLE  METER READING/SCALE                   35.1/3
   NOX  SAMPLE  PPM                                  105.3
   NOX  BACKGRD METER READING/SCALE                     .3/3
   NOX  BACKGRD PPM                                     .9

  HC   CONCENTRATION PPM                              2312
  CO   CONCENTRATION PPM                              2709
  CO2  CONCENTRATION PCT                              1.04
  NOX  CONCENTRATION PPM                             104.5
  HC   MASS (GRAMS)                                 559.87
  CO   MASS (GRAMS)                                1324.35
  CO2  MASS (GRAMS)                                8019.03
  NOX  MASS (GRAMS)                                  83.92

HC   GRAMS/MILE  77.33
CO   GRAMS/MILE  182.9
CO2  GRAMS/MILE   1108
NOX  GRAMS/MILE  11.59

HC   GRAMS/LB OF FUEL  62.07      HC   GRAMS/MIN  24.43
CO   GRAMS/LB OF FUEL  146.8      CO   GRAMS/MIN   57.8
CO2  GRAMS/LB OF FUEL    889      CO2  GRAMS/MIN    350
NOX  GRAMS/LB OF FUEL   9.30      NOX  GRAMS/MIN   3.66


TOTAL CARBON = 3241.29 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.25 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G9

DATE 10/ 9/74                 TIME  1420 HRS.          TEST NO.  7
MODEL  1966 CHEVROLET         TRACTOR                  ENGINE 366 CID V8
DRIVER  RKH                   TEST WT. 22700 LB.       GVW34000 LB.

WET BULB TEMP  68 F           DRY BULB TEMP  84 F      REL. HUM.  43.7 PCT
SPEC. HUM.  77.6 GRAIN/LB     BARO.  29.34 IN. HG.     MEASURED FUEL  9.77 LB.

  RUN DURATION           25.40 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H20
  BLOWER DIF.  PRESS.    14.0  IN. H20
  BLOWER INLET TEMP.      124  DEG. F
  BLOWER REVOLUTIONS   29185
  BLOWER CU. FT./REV.   .642

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE           23.3/4
   HC  SAMPLE  PPM                           2330
   HC  BACKGRD METER READING/SCALE            2.1/3
   HC  BACKGRD PPM                             21
   CO  SAMPLE  METER READING/SCALE           66.9/2
   CO  SAMPLE  PPM                           2510
   CO  BACKGRD METER READING/SCALE             .5/2
   CO  BACKGRD PPM                             14
   CO2 SAMPLE  METER READING/SCALE           63.2/3
   CO2 SAMPLE  PERCENT                       1.06
   CO2 BACKGRD METER READING/SCALE            3.1/3
   CO2 BACKGRD PERCENT                        .04
   NOX SAMPLE  METER READING/SCALE           35.7/3
   NOX SAMPLE  PPM                          107.1
   NOX BACKGRD METER READING/SCALE             .4/3
   NOX BACKGRD PPM                            1.2

   HC  CONCENTRATION PPM                     2311
   CO  CONCENTRATION PPM                     2411
   CO2 CONCENTRATION PCT                     1.02
   NOX CONCENTRATION PPM                    106.0
   HC  MASS (GRAMS)                        614.45
   CO  MASS (GRAMS)                       1294.02
   CO2 MASS (GRAMS)                       8617.94
   NOX MASS (GRAMS)                         93.49

HC  GRAMS/MILE  84.87
CO  GRAMS/MILE  178.7
CO2 GRAMS/MILE   1190
NOX GRAMS/MILE  12.91

HC  GRAMS/LB OF FUEL  62.89      HC  GRAMS/MIN  24.19
CO  GRAMS/LB OF FUEL  132.4      CO  GRAMS/MIN   50.9
CO2 GRAMS/LB OF FUEL    882      CO2 GRAMS/MIN    339
NOX GRAMS/LB OF FUEL   9.57      NOX GRAMS/MIN   3.68


TOTAL CARBON = 3439.01 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.75 LB.
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                         EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER  G9

DATE 10/ 9/74                  TIME  1455 HRS.          TEST NO.  8
MODEL  1966 CHEVROLET          TRACTOR                  ENGINE 366 CID V8
DRIVER  RKH                    TEST WT. 22700 LB.       GVW34000 LB.

WET BULB TEMP  69 F            DRY BULB TEMP  86 F      REL. HUM.  42.1 PCT
SPEC. HUM.  79.6 GRAIN/LB  BARO.  29.34 IN. HG.     MEASURED FUEL  8.58 LB.

  RUN DURATION          21.63 MINUTES
  BLOWER INLET PRESS.    8.0  IN. H20
  BLOWER DIF.  PRESS.   14.0  IN. H20
  BLOWER INLET TEMP.     123  DEG. F
  BLOWER REVOLUTIONS   24853
  BLOWER CU. FT./REV.   .642

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 27.0/4
   HC  SAMPLE  PPM                                 2700
   HC  BACKGRD METER READING/SCALE                  2.3/3
   HC  BACKGRD PPM                                   23
   CO  SAMPLE  METER READING/SCALE                 79.4/2
   CO  SAMPLE  PPM                                 3176
   CO  BACKGRD METER READING/SCALE                   .3/2
   CO  BACKGRD PPM                                    8
   CO2 SAMPLE  METER READING/SCALE                 65.9/3
   CO2 SAMPLE  PERCENT                             1.11
   CO2 BACKGRD METER READING/SCALE                  2.5/3
   CO2 BACKGRD PERCENT                              .04
   NOX SAMPLE  METER READING/SCALE                 36.5/3
   NOX SAMPLE  PPM                                109.5
   NOX BACKGRD METER READING/SCALE                   .5/3
   NOX BACKGRD PPM                                  1.5

   HC  CONCENTRATION PPM                           2680
   CO  CONCENTRATION PPM                           3058
   CO2 CONCENTRATION PCT                           1.08
   NOX CONCENTRATION PPM                          108.2
   HC  MASS (GRAMS)                              608.01
   CO  MASS (GRAMS)                             1400.63
   CO2 MASS (GRAMS)                             7797.69
   NOX MASS (GRAMS)                               81.41

HC  GRAMS/MILE  83.98
CO  GRAMS/MILE  193.5
CO2 GRAMS/MILE   1077
NOX GRAMS/MILE  11.24

HC  GRAMS/LB OF FUEL  70.86      HC  GRAMS/MIN  28.11
CO  GRAMS/LB OF FUEL  163.2      CO  GRAMS/MIN   64.8
CO2 GRAMS/LB OF FUEL    909      CO2 GRAMS/MIN    361
NOX GRAMS/LB OF FUEL   9.49      NOX GRAMS/MIN   3.76


TOTAL CARBON = 3255.28 GRAMS
CARBON BALANCE FUEL WEIGHT =  8.29 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  69

DATE 10/ 9/74                 TIME  1530 HRS.          TEST NO.  9
MODEL  1966 CHEVROLET         TRACTOR                  ENGINE 366 CID V8
DRIVER  RKH                   TEST WT. 22700 LB.       GVW34000 LB.

WET BULB TEMP  69 F           DRY BULB TEMP  87 F      REL. HUM.  39.9 PCT
SPEC. HUM.  77.9 GRAIN/LB     BARO.  29.34 IN. HG.     MEASURED FUEL  9.70 LB.

  RUN DURATION            26.61 MINUTES
  BLOWER INLET PRESS.      8.0  IN. H2O
  BLOWER DIF.  PRESS.     14.0  IN. H2O
  BLOWER INLET TEMP.       121  DEG. F
  BLOWER REVOLUTIONS     30574
  BLOWER CU. FT./REV.     .643

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 22.4/4
   HC  SAMPLE  PPM                                 2240
   HC  BACKGRD METER READING/SCALE                  2.5/3
   HC  BACKGRD PPM                                   25
   CO  SAMPLE  METER READING/SCALE                 65.7/2
   CO  SAMPLE  PPM                                 2450
   CO  BACKGRD METER READING/SCALE                   .4/2
   CO  BACKGRD PPM                                   11
   CO2 SAMPLE  METER READING/SCALE                 62.8/3
   CO2 SAMPLE  PERCENT                             1.05
   CO2 BACKGRD METER READING/SCALE                  1.7/2
   CO2 BACKGRD PERCENT                              .04
   NOX SAMPLE  METER READING/SCALE                 32.3/3
   NOX SAMPLE  PPM                                 96.9
   NOX BACKGRD METER READING/SCALE                   .6/3
   NOX BACKGRD PPM                                  1.8

   HC  CONCENTRATION PPM                           2218
   CO  CONCENTRATION PPM                           2359
   CO2 CONCENTRATION PCT                           1.01
   NOX CONCENTRATION PPM                           95.3
   HC  MASS (GRAMS)                              621.66
   CO  MASS (GRAMS)                             1335.16
   CO2 MASS (GRAMS)                             9034.83
   NOX MASS (GRAMS)                               88.60

HC  GRAMS/MILE  85.86
CO  GRAMS/MILE  184.4
CO2 GRAMS/MILE   1248
NOX GRAMS/MILE  12.24

HC  GRAMS/LB OF FUEL  64.09     HC  GRAMS/MIN  23.36
CO  GRAMS/LB OF FUEL  137.6     CO  GRAMS/MIN   50.2
CO2 GRAMS/LB OF FUEL    931     CO2 GRAMS/MIN    340
NOX GRAMS/LB OF FUEL   9.13     NOX GRAMS/MIN   3.33


TOTAL CARBON = 3576.67 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.11 LB.
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TRUCK G-10

1969 FORD 43500 LB GCW TRACTOR
WITH 391 CID V8 ENGINE
(8 SARR TESTS)

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER G10

DATE 10/16/74                 TIME   950 HRS.          TEST NO.  1
MODEL  1967 FORD              TRACTOR                  ENGINE 391 CID V8
DRIVER  FMK                   TEST WT. 28400 LB.       GVW43500 LB.

WET BULB TEMP  52 F           DRY BULB TEMP  61 F      REL. HUM.  54.0 PCT
SPEC. HUM.  43.6 GRAINS/LB    BARO.  29.41 IN. HG.     MEASURED FUEL 11.63 LB.

  RUN DURATION            24.45 MINUTES
  BLOWER INLET PRESS.       8.5  IN. H2O
  BLOWER DIF.  PRESS.     14.0  IN. H2O
  BLOWER INLET TEMP.       133  DEG. F
  BLOWER REVOLUTIONS   28174
  BLOWER CU. FT./REV.   .639

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                 64.0/3
   HC   SAMPLE   PPM                                  640
   HC   BACKGRD METER READING/SCALE                   1.2/3
   HC   BACKGRD PPM                                    12
   CO   SAMPLE   METER READING/SCALE                 45.9/1
   CO   SAMPLE   PPM                                 4251
   CO   BACKGRD METER READING/SCALE                    .8/2
   CO   BACKGRD PPM                                    23
   CO2 SAMPLE   METER READING/SCALE                  81.8/3
   CO2 SAMPLE   PERCENT                              1.44
   CO2 BACKGRD METER READING/SCALE                    3.6/3
   CO2 BACKGRD PERCENT                                .05
   NOX SAMPLE   METER READING/SCALE                  43.2/2
   NOX SAMPLE   PPM                                  43.2
   NOX BACKGRD METER READING/SCALE                    .8/2
   NOX BACKGRD PPM                                     .8

   HC   CONCENTRATION PPM                             630
   CO   CONCENTRATION PPM                            4091
   CO2 CONCENTRATION PCT                             1.39
   NOX CONCENTRATION PPM                             42.5
   HC   MASS (GRAMS)                               158.52
   CO   MASS (GRAMS)                              2053.61
   CO2 MASS (GRAMS)                              11186.53
   NOX MASS (GRAMS)                                77.24

HC   GRAMS/MILE   21.90
CO   GRAMS/MILE  283.6
CO2 GRAMS/MILE    1545
NOX GRAMS/MILE   10.67

HC   GRAMS/LB OF FUEL   13.63      HC   GRAMS/MIN    6.48
CO   GRAMS/LB OF FUEL  176.6       CO   GRAMS/MIN   84.0
CO2 GRAMS/LB OF FUEL     962       CO2 GRAMS/MIN    458
NOX GRAMS/LB OF FUEL    6.64       NOX GRAMS/MIN   3.16


TOTAL CARBON = 4070.92 GRAMS
CARBON BALANCE FUEL WEIGHT = 10.36 LB.
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                  EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER G1P

DATE 10/16/74                 TIME  1035 HRS.          TEST NO.  2
MODEL  1969 FORD              TRACTOR                  ENGINE 391 CID V8
DRIVER  ERR                   TEST WT. 28900 LB.       GVW=43500 LB.

WET BULB TEMP  59 F           DRY BULB TEMP  68 F      REL. HUM.  38.7 PCT
SPEC. HUM.  39.8 GRAINS/LB   BARO.  29.41 IN. HG.     MEASURED FUEL 10.94 LB.

  RUN DURATION           22.64 MINUTES
  BLOWER INLET PRESS.     8.0  IN. H2O
  BLOWER DIF.  PRESS.   19.0  IN. H2O
  BLOWER INLET TEMP.     196  DEG. F
  BLOWER REVOLUTIONS  26065
  BLOWER CU. FT./REV.   .631

  RAW RESULTS
   HC   SAMPLE  METER READING/SCALE                  70.0/3
   HC   SAMPLE  PPM                                   700
   HC   BACKGRD METER READING/SCALE                   1.2/3
   HC   BACKGRD PPM                                    12
   CO   SAMPLE  METER READING/SCALE                  94.9/1
   CO   SAMPLE  PPM                                  4107
   CO   BACKGRD METER READING/SCALE                    .6/2
   CO   BACKGRD PPM                                    17
   CO2  SAMPLE  METER READING/SCALE                  82.9/3
   CO2  SAMPLE  PERCENT                              1.95
   CO2  BACKGRD METER READING/SCALE                   3.7/3
   CO2  BACKGRD PERCENT                               .05
   NOX  SAMPLE  METER READING/SCALE                  96.5/2
   NOX  SAMPLE  PPM                                  96.5
   NOX  BACKGRD METER READING/SCALE                    .6/2
   NOX  BACKGRD PPM                                    .6

   HC   CONCENTRATION PPM                             690
   CO   CONCENTRATION PPM                            3926
   CO2  CONCENTRATION PCT                            1.91
   NOX  CONCENTRATION PPM                            96.0
   HC   MASS (GRAMS)                               155.57
   CO   MASS (GRAMS)                              1788.05
   CO2  MASS (GRAMS)                             10107.47
   NOX  MASS (GRAMS)                                71.80

HC  GRAMS/MILE   21.49
CO  GRAMS/MILE  247.0
CO2 GRAMS/MILE   1396
NOX GRAMS/MILE    9.92

HC  GRAMS/LB OF FUEL  14.22      HC  GRAMS/MIN   6.87
CO  GRAMS/LB OF FUEL  163.4      CO  GRAMS/MIN   79.0
CO2 GRAMS/LB OF FUEL    924      CO2 GRAMS/MIN    446
NOX GRAMS/LB OF FUEL   6.56      NOX GRAMS/MIN   3.17


TOTAL CARBON = 3659.98 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.32 LB.
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                  EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER G10

DATE 10/16/79              TIME  1110 HRS.         TEST NO.  3
MODEL  1969 FORD           TRACTOR                 ENGINE 391 CID V8
DRIVER  EMK                TEST WT. 28900 LB.      GVW=43500 LB.

WET BULB TEMP  55 F        DRY BULB TEMP  72 F     REL. HUM.  31.5 PCT
SPEC. HUM.  37.2 GRAIN/LB  BARO.  29.41 IN. HG.    MEASURED FUEL 10.80 LB.

  RUN DURATION            22.33 MINUTES
  BLOWER INLET PRESS.      8.0  IN. H20
  BLOWER DIF.  PRESS.     19.0  IN. H20
  BLOWER INLET TEMP.       148  DEG. F
  BLOWER REVOLUTIONS    25726
  BLOWER CU. FT./REV.   .630

  BAG RESULTS
   HC   SAMPLE   METER READING/SCALE                68.7/3
   HC   SAMPLE   PPM                                 687
   HC   BACKGRD METER READING/SCALE                  1.5/3
   HC   BACKGRD PPM                                  15
   CO   SAMPLE   METER READING/SCALE                44.7/1
   CO   SAMPLE   PPM                                4078
   CO   BACKGRD METER READING/SCALE                  .4/2
   CO   BACKGRD PPM                                  11
   CO2  SAMPLE   METER READING/SCALE                83.5/3
   CO2  SAMPLE   PERCENT                            1.98
   CO2  BACKGRD METER READING/SCALE                  3.5/3
   CO2  BACKGRD PERCENT                              .05
   NOX  SAMPLE   METER READING/SCALE                97.8/2
   NOX  SAMPLE   PPM                                97.8
   NOX  BACKGRD METER READING/SCALE                  1.2/2
   NOX  BACKGRD PPM                                  1.2

   HC   CONCENTRATION PPM                            674
   CO   CONCENTRATION PPM                           3911
   CO2  CONCENTRATION PCT                           1.93
   NOX  CONCENTRATION PPM                           96.8
   HC   MASS (GRAMS)                              149.27
   CO   MASS (GRAMS)                             1748.55
   CO2  MASS (GRAMS)                            10109.20
   NOX  MASS (GRAMS)                              71.07

HC   GRAMS/MILE   20.62
CO   GRAMS/MILE  241.5
CO2  GRAMS/MILE   1396
NOX  GRAMS/MILE   9.82

HC   GRAMS/LB OF FUEL   13.82      HC   GRAMS/MIN    6.68
CO   GRAMS/LB OF FUEL   161.9      CO   GRAMS/MIN    78.3
CO2  GRAMS/LB OF FUEL     936      CO2  GRAMS/MIN     453
NOX  GRAMS/LB OF FUEL    6.58      NOX  GRAMS/MIN    3.18


TOTAL CARBON = 3638.07 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.26 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER 610

DATE 10/16/74                  TIME  1230 HRS.          TEST NO.  4
MODEL  1969 FORD               TRACTOR                  ENGINE 391 CID V8
DRIVER  GEM                    TEST WT. 28900 LB.       GVW=43500 LB.

WET BULB TEMP  54 F            DRY BULB TEMP  70 F      REL. HUM.  33.2 PCT
SPEC. HUM.  36.6 GRAIN/LB      BARO.  29.41 IN. HG.     MEASURED FUEL 11.91 LB.

  RUN DURATION           25.28 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.   11.5  IN. H2O
  BLOWER INLET TEMP.     145  DEG. F
  BLOWER REVOLUTIONS  29694
  BLOWER CU. FT./REV.   .637

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  68.3/3
   HC   SAMPLE  PPM                                   683
   HC   BACKGRD METER READING/SCALE                   1.4/3
   HC   BACKGRD PPM                                    14
   CO   SAMPLE  METER READING/SCALE                  44.4/1
   CO   SAMPLE  PPM                                  4036
   CO   BACKGRD METER READING/SCALE                    .4/2
   CO   BACKGRD PPM                                    11
   CO2 SAMPLE  METER READING/SCALE                   85.2/3
   CO2 SAMPLE  PERCENT                               1.51
   CO2 BACKGRD METER READING/SCALE                    4.4/3
   CO2 BACKGRD PERCENT                                .06
   NOX SAMPLE  METER READING/SCALE                   98.6/2
   NOX SAMPLE  PPM                                   98.6
   NOX BACKGRD METER READING/SCALE                    1.3/2
   NOX BACKGRD PPM                                    1.3

   HC  CONCENTRATION PPM                              671
   CO  CONCENTRATION PPM                             3866
   CO2 CONCENTRATION PCT                             1.46
   NOX CONCENTRATION PPM                             97.5
   HC  MASS (GRAMS)                                174.69
   CO  MASS (GRAMS)                               2031.19
   CO2 MASS (GRAMS)                              12099.64
   NOX MASS (GRAMS)                                 84.15

HC  GRAMS/MILE  24.12
CO  GRAMS/MILE  280.6
CO2 GRAMS/MILE   1671
NOX GRAMS/MILE  11.62

HC  GRAMS/LB OF FUEL  14.66      HC  GRAMS/MIN   6.77
CO  GRAMS/LB OF FUEL  170.5      CO  GRAMS/MIN   78.8
CO2 GRAMS/LB OF FUEL   1016      CO2 GRAMS/MIN    469
NOX GRAMS/LB OF FUEL   7.07      NOX GRAMS/MIN   3.26


TOTAL CARBON = 4329.47 GRAMS
CARBON BALANCE FUEL WEIGHT = 11.01 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER 610

DATE 10/16/74              TIME  1345 HRS.          TEST NO.  6
MODEL  1969 FORD           TRACTOR                  ENGINE 391 CID V8
DRIVER  GEM                TEST WT. 28900 LB.       GVW43500 LB.

WET BULB TEMP  55 F        DRY BULB TEMP  75 F      REL. HUM.  24.8 PCT
SPEC. HUM.  32.3 GRAIN/LB  BARO.  29.91 IN. HG.     MEASURED FUEL 10.98 LB.

  RUN DURATION          24.80 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   12.5  IN. H2O
  BLOWER INLET TEMP.     140  DEG. F
  BLOWER REVOLUTIONS  28484
  BLOWER CU. FT./REV.   .638

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                     70.3/3
   HC   SAMPLE  PPM                                      703
   HC   BACKGRD METER READING/SCALE                      1.3/3
   HC   BACKGRD PPM                                       13
   CO   SAMPLE  METER READING/SCALE                     43.9/1
   CO   SAMPLE  PPM                                     3897
   CO   BACKGRD METER READING/SCALE                      .6/2
   CO   BACKGRD PPM                                       17
   CO2  SAMPLE  METER READING/SCALE                     77.6/3
   CO2  SAMPLE  PERCENT                                 1.35
   CO2  BACKGRD METER READING/SCALE                      2.9/3
   CO2  BACKGRD PERCENT                                  .04
   NOX  SAMPLE  METER READING/SCALE                     92.9/2
   NOX  SAMPLE  PPM                                     92.9
   NOX  BACKGRD METER READING/SCALE                      1.0/2
   NOX  BACKGRD PPM                                      1.0

   HC   CONCENTRATION PPM                                692
   CO   CONCENTRATION PPM                               3750
   CO2  CONCENTRATION PCT                               1.31
   NOX  CONCENTRATION PPM                               92.0
   HC   MASS (GRAMS)                                  174.23
   CO   MASS (GRAMS)                                 1906.82
   CO2  MASS (GRAMS)                                10539.66
   NOX  MASS (GRAMS)                                   76.88

HC   GRAMS/MILE  24.07
CO   GRAMS/MILE  263.4
CO2  GRAMS/MILE   1956
NOX  GRAMS/MILE  10.62

HC   GRAMS/LB OF FUEL  15.87     HC   GRAMS/MIN   7.03
CO   GRAMS/LB OF FUEL  173.7     CO   GRAMS/MIN   76.9
CO2  GRAMS/LB OF FUEL    960     CO2  GRAMS/MIN    425
NOX  GRAMS/LB OF FUEL   7.00     NOX  GRAMS/MIN   3.10


TOTAL CARBON = 3845.03 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.79 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER G10

DATE 10/16/78                 TIME  1420 HRS.          TEST NO.  7
MODEL  1969 FORD              TRACTOR                  ENGINE 391 CID V8
DRIVER  RKH                   TEST WT. 28900 LB.       GVW43500 LB.

WET BULB TEMP  57 F           DRY BULB TEMP  78 F      REL. HUM.  24.6 PCT
SPEC. HUM.  35.5 GRAIN/LB  BARO.  29.91 IN. HG.        MEASURED FUEL 11.15 LB.

  CVS DURATION           22.17 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H2O
  BLOWER DIF.  PRESS.   12.5  IN. H2O
  BLOWER INLET TEMP.     150  DEG. F
  BLOWER REVOLUTIONS  25998
  BLOWER CU. FT./REV.  .631

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                55.7/3
   HC   SAMPLE  PPM                                 557
   HC   BACKGRD METER READING/SCALE                 1.2/3
   HC   BACKGRD PPM                                  12
   CO   SAMPLE  METER READING/SCALE                47.3/1
   CO   SAMPLE  PPM                                4460
   CO   BACKGRD METER READING/SCALE                  .5/2
   CO   BACKGRD PPM                                  19
   CO2 SAMPLE  METER READING/SCALE                 90.1/3
   CO2 SAMPLE  PERCENT                             1.62
   CO2 BACKGRD METER READING/SCALE                  3.5/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                 35.3/3
   NOX SAMPLE  PPM                                105.9
   NOX BACKGRD METER READING/SCALE                  .2/3
   NOX BACKGRD PPM                                  .6

   HC   CONCENTRATION PPM                           547
   CO   CONCENTRATION PPM                          4279
   CO2 CONCENTRATION PCT                           1.58
   NOX CONCENTRATION PPM                          105.4
   HC   MASS (GRAMS)                             119.72
   CO   MASS (GRAMS)                            1888.81
   CO2 MASS (GRAMS)                            11022.61
   NOX MASS (GRAMS)                               76.52

HC   GRAMS/MILE   16.54
CO   GRAMS/MILE   260.9
CO2 GRAMS/MILE    1522
NOX GRAMS/MILE   10.57

HC   GRAMS/LB OF FUEL  10.74      HC   GRAMS/MIN    5.40
CO   GRAMS/LB OF FUEL  169.4      CO   GRAMS/MIN    85.2
CO2 GRAMS/LB OF FUEL     989      CO2 GRAMS/MIN     497
NOX GRAMS/LB OF FUEL    6.86      NOX GRAMS/MIN    3.45


TOTAL CARBON = 3921.90 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.98 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER G10

DATE 10/16/79                  TIME  1500 HRS.            TEST NO.  8
MODEL  1969 FORD               TRACTOR                    ENGINE 391 CID V8
DRIVER  RRM                    TEST WT. 28900 LB.         GVW43500 LB.

WET BULB TEMP  58 F            DRY BULB TEMP  79 F        REL. HUM.  25.6 PCT
SPEC. HUM.  38.1 GRAIN/LB      BARO.  29.41 IN. HG.       MEASURED FUEL 11.60 LB.

  RUN DURATION            23.53 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H20
  BLOWER DIF.  PRESS.     12.5  IN. H20
  BLOWER INLET TEMP.       135  DEG. F
  BLOWER REVOLUTIONS     27062
  BLOWER CU. FT./REV.     .691

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                       67.8/3
   HC  SAMPLE  PPM                                        678
   HC  BACKGRD METER READING/SCALE                        1.2/3
   HC  BACKGRD PPM                                         12
   CO  SAMPLE  METER READING/SCALE                       95.3/1
   CO  SAMPLE  PPM                                       4164
   CO  BACKGRD METER READING/SCALE                         .5/2
   CO  BACKGRD PPM                                         19
   CO2 SAMPLE  METER READING/SCALE                       89.1/3
   CO2 SAMPLE  PERCENT                                   1.99
   CO2 BACKGRD METER READING/SCALE                        2.0/3
   CO2 BACKGRD PERCENT                                    .03
   NOX SAMPLE  METER READING/SCALE                       99.5/2
   NOX SAMPLE  PPM                                       99.5
   NOX BACKGRD METER READING/SCALE                         .8/2
   NOX BACKGRD PPM                                         .8

   HC  CONCENTRATION PPM                                 668
   CO  CONCENTRATION PPM                                3999
   CO2 CONCENTRATION PCT                                1.96
   NOX CONCENTRATION PPM                                98.8
   HC  MASS (GRAMS)                                   161.86
   CO  MASS (GRAMS)                                  1956.91
   CO2 MASS (GRAMS)                                 11312.96
   NOX MASS (GRAMS)                                    79.44

HC  GRAMS/MILE  22.36
CO  GRAMS/MILE  270.3
CO2 GRAMS/MILE   1562
NOX GRAMS/MILE  10.97

HC  GRAMS/LB OF FUEL  13.95      HC  GRAMS/MIN   6.88
CO  GRAMS/LB OF FUEL  168.7      CO  GRAMS/MIN   83.2
CO2 GRAMS/LB OF FUEL    975      CO2 GRAMS/MIN    481
NOX GRAMS/LB OF FUEL   6.85      NOX GRAMS/MIN   3.38


TOTAL CARBON = 4066.21 GRAMS
CARBON BALANCE FUEL WEIGHT = 10.35 LB.
```

```
                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                  TRUCK NUMBER G10

DATE 10/16/74                TIME  1540 HRS.          TEST NO.  4
MODEL  1969 FORD             TRACTOR                  ENGINE 391 CID V8
DRIVER  RRM                  TEST WT. 28900 LB.       GVW43500 LB.

WET BULB TEMP  68 F          DRY BULB TEMP  80 F      REL. HUM.  54.0 PCT
SPEC. HUM.  84.1 GRAIN/LB    BARO.  29.41 IN. HG.     MEASURED FUEL 10.54 LB.

  RUN DURATION            21.33 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     12.5  IN. H2O
  BLOWER INLET TEMP.       135  DEG. F
  BLOWER REVOLUTIONS     24547
  BLOWER CU. FT./REV.     .641

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   51.4/3
   HC   SAMPLE  PPM                                    514
   HC   BACKGRD METER READING/SCALE                    1.5/3
   HC   BACKGRD PPM                                    15
   CO   SAMPLE  METER READING/SCALE                   45.4/1
   CO   SAMPLE  PPM                                   4179
   CO   BACKGRD METER READING/SCALE                    .6/2
   CO   BACKGRD PPM                                    17
   CO2  SAMPLE  METER READING/SCALE                   84.9/3
   CO2  SAMPLE  PERCENT                               1.51
   CO2  BACKGRD METER READING/SCALE                    3.4/3
   CO2  BACKGRD PERCENT                                .05
   NOX  SAMPLE  METER READING/SCALE                   99.4/2
   NOX  SAMPLE  PPM                                   99.4
   NOX  BACKGRD METER READING/SCALE                    1.1/2
   NOX  BACKGRD PPM                                    1.1

  HC   CONCENTRATION PPM                               501
  CO   CONCENTRATION PPM                              3970
  CO2  CONCENTRATION PCT                              1.46
  NOX  CONCENTRATION PPM                              98.5
  HC   MASS (GRAMS)                                 110.20
  CO   MASS (GRAMS)                                1762.66
  CO2  MASS (GRAMS)                               10263.44
  NOX  MASS (GRAMS)                                  71.80

HC  GRAMS/MILE  15.22
CO  GRAMS/MILE  243.5
CO2 GRAMS/MILE   1418
NOX GRAMS/MILE   9.92

HC  GRAMS/LB OF FUEL  10.46      HC  GRAMS/MIN   5.17
CO  GRAMS/LB OF FUEL  167.2      CO  GRAMS/MIN   82.7
CO2 GRAMS/LB OF FUEL    974      CO2 GRAMS/MIN    481
NOX GRAMS/LB OF FUEL   6.81      NOX GRAMS/MIN   3.37


TOTAL CARBON = 3652.38 GRAMS
CARBON BALANCE FUEL WEIGHT =  9.30 LB.
```

APPENDIX G
EMISSION RESULTS IN VOLUMETRIC CONCENTRATIONS FROM INDIVIDUAL TESTS OF THE NINE-MODE FTP FOR TEN PRECONTROLLED GASOLINE-POWERED TRUCKS

TRUCK G-1. 1967 FORD 17000 LB GVW VAN WITH 330 CID V8 ENGINE

```
[illegible]
[illegible]                                                                    29.36
[illegible]
------------------------------------------------------------------------------------------------------------
[illegible]   CONCENTRATIONS               DILUTION   C O R R E C T E D     WEIGHTING   W E I G H T E D
               HC     CO    CO2    NO(X)   FACTOR     HC     CO   NO(X)    FACTOR      HC     CO    NO(X)
------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        764.  [illegible] [illegible] [illegible] 1.148  [illegible] [illegible] [illegible] .232  [illegible] [illegible] [illegible]
2 16 HG       313.  3.227  [illegible] [illegible] 0.970  [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
3 10 HG       282.  3.381  [illegible] [illegible] 0.969  [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
4 16 HG       [illegible] 4.661  [illegible] [illegible] 0.999  262.  4.551  [illegible] .087  [illegible] [illegible] [illegible]
5 19 HG       237.  4.569  [illegible] [illegible] 1.010  200.  4.51  [illegible] .047  [illegible] [illegible] [illegible]
6 16 HG       [illegible] 4.102  [illegible] [illegible] 0.988  240.  4.22  [illegible] .169  [illegible] [illegible] [illegible]
7 3 HG        [illegible] 3.481  11.   [illegible] 1.001  219.  3.49  [illegible] .202  [illegible] [illegible] [illegible]
8 16 HG       [illegible] 3.249  11.7  [illegible] 0.991  237.  3.2   [illegible] .083  [illegible] [illegible] [illegible]
9 CT          6537. 3.891  [illegible] [illegible] 1.197  7843. 4.65  [illegible] .021  [illegible] [illegible] [illegible]
                                              -------(CYCLE COMPOSITE)--------  427.  4.499  111 .

CYCLE 2
1 IDLE        764.  6.336  [illegible] [illegible] 1.148  877.  7.5   55.   .232  [illegible] [illegible] [illegible]
2 16 HG       361.  4.469  12.   [illegible] 0.957  330.  4.329  819.  .089  [illegible] [illegible] [illegible]
3 10 HG       297.  3.671  13.28  1648.  0.931  263.  [illegible] 1534.  [illegible] [illegible] [illegible] [illegible]
4 16 HG       278.  4.587  12.29  [illegible] 0.973  290.  4.464  [illegible] .193  [illegible] [illegible] [illegible]
5 19 HG       287.  3.897  12.59  411.   0.976  280.  3.833  461.  .041  [illegible] [illegible] [illegible]
6 16 HG       287.  4.401  12.44  [illegible] 0.769  279.  4.273  [illegible] .089  [illegible] [illegible] [illegible]
7 3 HG        266.  [illegible] 11.70  [illegible] 0.992  264.  5.262  1468.  [illegible] [illegible] [illegible] [illegible]
8 16 HG       292.  4.471  12.   [illegible] 0.779  288.  4.41  [illegible] [illegible] [illegible] [illegible] [illegible]
9 CT          [illegible] 4.343  3.   243.   1.224  7447. 4.738  [illegible] .021  [illegible] [illegible] [illegible]
                                              -------(CYCLE COMPOSITE)--------  420.  [illegible] 11 .

CYCLE 3
1 IDLE        619.  7.761  8.2   [illegible] 1.133  701.  8.821  [illegible] .232  [illegible] [illegible] [illegible]
2 16 HG       338.  4.634  12.28  [illegible] 0.969  327.  4.489  81 .  [illegible] 29.  [illegible] [illegible]
3 10 HG       276.  3.71   13.   1188.  0.951  263.  3.338  16 .  [illegible] [illegible] [illegible] [illegible]
4 16 HG       279.  4.63   12.   828.   0.97   272.  4.526  [illegible] [illegible] [illegible] [illegible] [illegible]
5 19 HG       29 .  4.031  12.   443.   0.979  282.  3.966  4  .  [illegible] 12.  [illegible] [illegible]
6 16 HG       27 .  4.71   12.   913.   0.973  263.  4.586  [illegible] [illegible] 23.  [illegible] 19.
7 3 HG        24 .  5.040  11.   13  .  0.990  241.  4.992  14  .  [illegible] 55.  [illegible] [illegible]
8 16 HG       262.  4.69   11.76  779.   1.008  264.  4.731  [illegible] [illegible] [illegible] [illegible] [illegible]
9 CT          5699. 4.331  3.4   246.   1.225  7039. 5.349  [illegible] [illegible] [illegible] [illegible] [illegible]
                                              -------(CYCLE COMPOSITE)--------  40 .  [illegible] 1188.

CYCLE 4
1 IDLE        619.  7.781  8.24  1 9.   1.133  701.  8.821  17 .  [illegible] 23.  [illegible] 6.
2 16 HG       283.  4.6    12.1  819.   0.981  278.  4.536  [illegible] [illegible] 23.  [illegible] 71.
3 10 HG       235.  3.732  13.63  1711.  0.957  225.  3.577  163 .  [illegible] [illegible] [illegible] [illegible]
4 16 HG       236.  4.80   12.86  888.   0.986  233.  4.736  87 .  [illegible] 21.  [illegible] 78.
5 19 HG       227.  4.11   12.37  461.   0.966  220.  4.067  45 .  [illegible] 11.  [illegible] [illegible]
6 16 HG       232.  4.600  12.31  872.   0.976  226.  4.489  851.  [illegible] 20.  [illegible] 76.
7 3 HG        228.  4.973  11.87  1533.  0.995  283.  4.896  1493.  [illegible] 37.  [illegible] [illegible]
8 16 HG       228.  4.96   11.98  848.   0.985  223.  4.911  790.  [illegible] [illegible] [illegible] 71.
9 CT          5023. 4.164  3.34  261.   1.261  7392. 5.250  329.  [illegible] [illegible] [illegible] [illegible]
                                              -------(CYCLE COMPOSITE)--------  [illegible] [illegible] 117 .
```

```
AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)    443.   4.494  1125.

AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)    403.   4.577  1173.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC    0.35*(  443.) + 0.65*(  403.) =   417.      PPM

 CO    0.35*( 4.494) + 0.65*( 4.577) =      4.547 PERCENT

NO(X)  0.35*(11  .) + 0.65*( 1173.) =  1156.      PPM

DILUTION FACTOR = 14.5/(CO2+0.5CO+10.0HC)

NO HUMIDITY CORRECTION FACTOR (K) =  1.021

CORRECTED NO = 1178 PPM
```

```
[illegible]

AVERAGE SUB-COMPOSITE VALUES FOR CYCLES 1&2)   400.   4.526   1076.

AVERAGE SUB-COMPOSITE VALUES FOR CYCLES 3&4)   367.   4.595   1053.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC    0.35*(  400.) + 0.65*(  367.) =   379.     PPM

 CO    0.35*( 4.526) + 0.65*( 4.595) =      4.570 PERCENT

NO(R)  0.35*( 1076.) + 0.65*( 1053.) =  1061.     PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

NO HUMIDITY CORRECTION FACTOR (K) =   1.028
```

CORRECTED NO = 1091 PPM

TRUCK G-2

1968 IHC 18200 LB GVW VAN
WITH 304 CID V8 ENGINE

[illegible]

```
AVERAGE SUB-(COMPOSITE VALUES FOR CYCLES 1&2)   466.  2.733  1542.

AVERAGE SUB-(COMPOSITE VALUES FOR CYCLES 3&4)   469.  2.757  1557.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC    0.35*(  466.) + 0.65*(  469.) =   468.    PPM

 CO    0.35*( 2.733) + 0.65*( 2.757) =      2.749 PERCENT

NO(X)  0.35*( 1542.) + 0.65*( 1557.) =  1552.    PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

NO HUMIDITY CORRECTION FACTOR (K) = 0,962

CORRECTED NO = 1493 PPM
```

```
[illegible] 16-53 68 IHC [illegible] 1N.200  7/31/74 RUN 3:00PM
[illegible] 69200 3.4 IHC [illegible] 29. DWELL W/D 62/73 [illegible] 29.23 [illegible]
PAGE 2
------------------------------------------------------------------------------------------------------------------
FEDERAL     CONCENTRATION AS MEASURED   DILUTION   M O D E  S U M   WEIGHTING
MODE          HC      CO    CO2  NOX(K)   FACTOR      HC      CO  NOX(K)  FACTOR      HC      CO   NOX(K)
------------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE       896.   0.336   6.11    41.    1.446    1986.   9.160     36.  0.036     36.  [illegible]  [illegible]
2 16 MG      449.   1.636  13.30  1333.    0.986     443.   1.633   1316.  0.2[illegible]  [illegible]  [illegible]  [illegible]
3 19 MG      379.   1.997  13.30  2333.    0.978     356.   1.932   2274.  0.2[illegible]  [illegible]  [illegible]  [illegible]
4 16 MG      318.   2.063  13.37  1514.    0.979     37[illegible]  2.[illegible]  14[illegible]  0.3[illegible]  [illegible]  [illegible]  [illegible]
5 19 MG      3[illegible]   1.764  13.[illegible]   743.    1.010     334.   1.[illegible]   752.  0.037     3.  [illegible]  [illegible]
6 16 MG      [illegible]   1.774  13.02  1310.    0.963     341.   1.[illegible]   1479.  0.[illegible]  [illegible]  [illegible]  [illegible]
7 [illegible] 321.   3.827  12.9[illegible]  1411.    0.955     317.   3.[illegible]   1346.  0.2[illegible]  [illegible]  [illegible]  [illegible]
8 16 MG      316.   1.924  13.36  1393.    0.976     308.   1.[illegible]77  1336.  0.0[illegible]  [illegible]  [illegible]  [illegible]
9 C.T.      4228.   3.639   3.34   202.    1.447    6113.   5.255    292.  0.0[illegible]  [illegible]  [illegible]  [illegible]
                                                  -------(CYCLE COMPOSITE)-------  49[illegible]  [illegible]  [illegible]
CYCLE 2
1 IDLE       896.   0.336   6.11    40.    1.446    1506.   9.[illegible]     38.  0.[illegible]  [illegible]  [illegible]  [illegible]
2 16 MG      360.   1.447  13.43  1373.    0.980     353.   1.[illegible]  1346.  0.[illegible]  [illegible]  [illegible]  [illegible]
3 19 MG      333.   2.103  13.65  2176.    0.963     321.   2.[illegible]  2097.  0.237  [illegible]  [illegible]  [illegible]
4 16 MG      318.   1.699  13.39  1629.    0.974     31[illegible]  1.[illegible]  1586.  0.[illegible]  [illegible]  [illegible]  [illegible]
5 19 MG      293.   2.425  12.94   831.    1.002     296.   2.[illegible]   832.  [illegible]  [illegible]  [illegible]  [illegible]
6 16 MG      3[illegible]   1.67[illegible]  13.57  1573.    0.977     301.   1.[illegible]  1539.  0.[illegible]  [illegible]  [illegible]  [illegible]
7 [illegible] 29[illegible]  3.79[illegible]  13.21  1431.    0.953     27[illegible]  3.6[illegible]  1363.  [illegible]  [illegible]  [illegible]  [illegible]
8 16 MG      27[illegible]  2.11[illegible]  13.51  1634.    0.973     26[illegible]  2.0[illegible]  1609.  0.[illegible]  [illegible]  [illegible]  [illegible]
9 C.T.      4221.   3.957   3.63   213.    1.426    6[illegible]   5.64[illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
                                                  -------(CYCLE COMPOSITE)-------  [illegible]  [illegible]  [illegible]
CYCLE 3
1 IDLE       63[illegible]  7.339   8.33    30.    1.373     87[illegible]  9.663     [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
2 16 MG      331.   1.99[illegible]  13.46  1378.    0.976     3[illegible]   1.949   1343.  0.229  [illegible]  [illegible]  [illegible]
3 19 MG      [illegible]7.  2.209  13.[illegible]7  2225.    0.965     31[illegible]  2.133   21[illegible]  0.297  [illegible]  [illegible]  [illegible]
4 16 MG      3[illegible]   2.236  13.34  1532.    0.974     3[illegible]   1.9[illegible]  1392.  [illegible]  [illegible]  [illegible]  [illegible]
5 19 MG      [illegible]   2.455  13.[illegible]   71[illegible]  0.997     28[illegible]  2.[illegible]   [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
6 16 MG      30[illegible]  1.[illegible]  13.[illegible]4  1483.    0.975     293.   1.[illegible]  1447.  0.[illegible]  [illegible]  [illegible]  [illegible]
7 [illegible] 28[illegible]  3.830  12.[illegible]  1432.    0.952     273.   3.663   1363.  0.263  [illegible]  [illegible]  [illegible]
8 16 MG      29[illegible]  2.[illegible]  13.36  1374.    0.974     254.   1.961   1333.  0.089  [illegible]  [illegible]  [illegible]
9 C.T.      3[illegible]73.  [illegible]  4.1[illegible]   22[illegible]  1.413    3476.   5.567    31[illegible]  0.321  113.  [illegible]  [illegible]
                                                  -------(CYCLE COMPOSITE)-------  4[illegible]7.  [illegible]  [illegible]
CYCLE 4
1 IDLE       639.   7.339   8.33    30.    1.373     871.   9.663     67.  [illegible]  [illegible]  [illegible]  [illegible]
2 16 MG      364.   2.013  13.47  1333.    0.975     355.   1.963   1302.  0.089  [illegible]  [illegible]  [illegible]
3 19 MG      336.   2.333  13.51  2155.    0.963     326.   2.240   2076.  0.[illegible]  [illegible]  [illegible]  [illegible]
4 16 MG      31[illegible]  2.[illegible]  13.36  1627.    0.973     3[illegible]   1.[illegible]  1[illegible]  [illegible]  [illegible]  [illegible]  [illegible]
5 19 MG      293.   2.32[illegible]  13.[illegible]7   730.    0.997     2[illegible]   2.[illegible]   727.  [illegible]  14.  [illegible]  [illegible]
6 16 MG      3[illegible]   1.764  13.[illegible]  1325.    0.974     301.   1.914   1466.  [illegible]  [illegible]  [illegible]  [illegible]
7 [illegible] 28[illegible]  3.[illegible]  13.[illegible]  1427.    0.952     274.   3.606   135[illegible]  [illegible]  [illegible]  [illegible]  [illegible]
8 16 MG      2[illegible]   2.[illegible]34  13.33  1619.    0.[illegible]     289.   [illegible]  1[illegible]  [illegible]  [illegible]  [illegible]  [illegible]
9 C.T.      411[illegible]  [illegible]  [illegible]   [illegible]  1.[illegible]    3866.   3.740    116.  0.0[illegible]  [illegible]  [illegible]  [illegible]
                                                  -------(CYCLE COMPOSITE)-------  [illegible]  [illegible]  [illegible]


AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)    472.   2.772  1518.

AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)    436    2.872  1498.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC    0.35*( 472.) + 0.65*( 436.) =   445.    PPM

 CO    0.35*( 2.772) + 0.65*( 2.872) =     2.837 PERCENT

NO(K)  0.35*( 1518.) + 0.65*( 1498.) =  1505.    PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.6*HC)

NO HUMIDITY CORRECTION FACTOR (K) =   0.962

CORRECTED NO = 1448 PPM
```

TRUCK G-3

1967 FORD 10000 LB GVW VAN
WITH 300 CID I6 ENGINE

```
1967 FORD WITH 300 CID I6  TRUCK G-3  RUN 1  8/9/74              K =1.018     HUM = 80  GR/LB
--------------------------------------------------------------------------------------------------------
FEDERAL        CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D    WEIGHTING      W E I G H T E D
MODE             HC     CO     CO2    NO     FACTOR     HC    CO     NO     FACTOR       HC      CO      NO
--------------------------------------------------------------------------------------------------------
CYCLE 1
       1 IDLE     386  7.195   8.210    59    1.186     458  8.534    69     .036     16.483   .307    2.306
       2 16"HG    313  1.902  13.660   516     .967     303  1.917   499     .089     26.990   .171   44.426
       3 10"HG    261  4.932  12.100  1175     .977     255  4.816  1147     .257     65.505  1.238  294.900
       4 16"HG    290  2.057  13.680   547     .965     280  1.986   528     .089     24.914   .177   46.992
       5 19"HG    281  2.236  13.460   305     .974     274  2.179   297     .047     12.868   .102   13.960
       6 16"HG    297  1.970  13.700   545     .966     287  1.904   527     .089     25.542   .169   46.870
       7  3"HG    220  4.645  12.990  1718     .967     213  4.490  1661     .283     60.184  1.271  469.904
       8 16"HG    208  2.110  13.690  1950     .969     201  2.044  1889     .089     17.931   .182  168.105
       9 C.T.    3457  5.447   6.120   251    1.153    3986  6.280   289     .021     83.697   .132    6.077
       SUM-------------(CYCLE COMPOSITE)-------------------------------------   334.873  3.749 1093.620
CYCLE 2
       1 IDLE     386  7.197   8.070    59    1.200     463  8.635    65     .036     16.672   .311    2.332
       2 16"HG    276  1.912  13.710  1830     .965     267  1.853  1773     .089     23.802   .165  157.819
       3 10"HG    297  5.265  11.830  1187     .981     291  5.164  1164     .257     74.866  1.327  299.214
       4 16"HG    245  1.953  13.700  1939     .970     238  1.895  1882     .089     21.161   .169  167.476
       5 19"HG    232  2.354  13.450   964     .975     226  2.294   940     .047     10.627   .108   44.159
       6 16"HG    237  1.965  13.710  1904     .970     230  1.906  1847     .089     20.460   .170  164.372
       7  3"HG    238  4.694  12.380  1771     .968     230  4.542  1714     .283     65.178  1.285  485.003
       8 16"HG    230  2.172  13.700  1908     .965     222  2.095  1840     .089     19.742   .186  163.776
       9 C.T.    3463  5.465   6.030   242    1.160    4016  6.338   281     .021     84.352   .133    5.899
       SUM-------------(CYCLE COMPOSITE)-------------------------------------   336.852  3.854 1490.099
CYCLE 3
       1 IDLE     462  7.194   8.280    52    1.172     541  8.429    61     .036     19.486   .303    2.193
       2 16"HG    291  1.917  13.680  1770     .970     282  1.859  1716     .089     25.115   .165  152.760
       3 10"HG    291  4.433  12.540  1412     .962     280  4.265  1359     .257     71.955  1.096  349.190
       4 16"HG    250  2.223  13.600  1884     .968     242  2.152  1823     .089     21.535   .191  162.287
       5 19"HG    238  2.131  13.500   935     .978     233  2.085   915     .047     10.943   .098   42.989
       6 16"HG    241  1.925  13.720  1894     .970     234  1.868  1838     .089     20.813   .166  163.571
       7  3"HG    245  4.646  12.950  1720     .964     236  4.480  1659     .283     66.856  1.268  469.358
       8 16"HG    233  2.102  13.690  1861     .970     226  2.040  1806     .089     20.123   .182  160.723
       9 C.T.    3408  5.476   6.100   227    1.158    3947  6.343   263     .021     82.895   .133    5.521
       SUM-------------(CYCLE COMPOSITE)-------------------------------------   339.721  3.603 1508.543
CYCLE 4
       1 IDLE     462  7.194   8.280    52    1.172     541  8.429    61     .036     19.486   .303    2.193
       2 16"HG    267  2.119  13.600  1816     .970     259  2.056  1762     .089     23.051   .183  156.782
       3 10"HG    290  5.098  11.960  1230     .978     284  4.987  1203     .257     72.910  1.282  309.239
       4 16"HG    241  1.995  13.730  1946     .967     233  1.930  1883     .089     20.751   .172  167.557
       5 19"HG    225  2.225  13.440   886     .980     221  2.181   868     .047     10.364   .102   40.810
       6 16"HG    234  2.022  13.680  1935     .970     227  1.962  1878     .089     20.208   .175  167.101
       7  3"HG    240  4.595  12.490  1723     .964     231  4.428  1666     .283     65.452  1.253  471.529
       8 16"HG    227  2.058  13.740  1952     .966     219  1.988  1885     .089     19.511   .177  167.779
       9 C.T.    3323  5.402   6.220   233    1.159    3852  6.261   270     .021     80.885   .131    5.671
       SUM-------------(CYCLE COMPOSITE)-------------------------------------   332.618  3.778 1488.661

AVERAGE SUM----(COMPOSITE VALUES FOR CYCLES 1 AND 2)------- ------------------   335.862  3.801 1291.836

AVERAGE SUM----(COMPOSITE VALUES FOR CYCLES 3 AND 4)-------------------------   336.169  3.691 1498.602

FOUR CYCLE COMPOSITE - REPORTED VALUES =   HC   0.35*(  335.862) + 0.65*(  336.169) =   335.922  PPM
                                           CO   0.35*(    3.801) + 0.65*(    3.691) =     3.730  PERCENT
                                           NO   0.35*( 1291.836) + 0.65*( 1498.602) =  1426.239  PPM
                                                                       CORRECTED NO =  1451.564  PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.*HC)
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[illegible] 6/9/74 [illegible] 2100 PA
[illegible] CID [illegible] 6/9/74 [illegible]
[illegible]
------------------------------------------------------------------------------------------------------------------------------
MODAL       CONCENTRATION AS MEASURED   DILUTION     A D J U S T E D    WEIGHTING         W E I G H T E D
[illegible]    HC     CO    CO2   NO(X)    FACTOR        HC      CO   NO(X)   FACTOR        HC      CO     NO(X)
------------------------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        331.  5.821  [illegible]  63.   1.2?3    [illegible]  7.?17   78.   0.036      13.  [illegible]    3.
2 16 HG       253.  2.?42  13.14  1002.   0.997      25?.  2.234  1796.   0.0?9      22.  [illegible]  16?.
3 10 HG       275.  3.385  11.79  1136.   0.991      273.  3.340  1126.   0.257      70.   1.293   289.
4 16 HG       220.  1.933  13.54  1929.   0.983      216.  1.902  1896.   0.089      19.  [illegible]  169.
5 19 HG       212.  2.431  13.22   9?6.   0.988      209.  2.421   944.   0.047      10.   0.114    44.
6 16 HG       222.  2.376  13.23  19?6.   0.981      218.  2.327  189?.   0.089      19.   ?.273   166.
7  3 HG       221.  4.678  12.21  17?7.   0.976      216.  4.568  1716.   0.283      61.   1.293   486.
8 16 HG       220.  2.040  13.13  1?11.   1.006      229.  2.051  1922.   0.089      20.   ?.183   171.
9 IDLE       3160.  5.131   6.52   172.   1.159     3665.  5.970   199.   0.021      77.   0.125     4.
                                                  ------(CYCLE COMPOSITE)--------    313.   3.656  1494.
CYCLE 2
1 IDLE        331.  5.831   6.73    63.   1.203      422.  7.017    76.   0.036      13.   ?.253     3.
2 16 HG       241.  2.286  13.46  177?.   0.976      236.  2.160  1741.   0.089      21.   ?.192   155.
3 10 HG       273.  5.247  11.80  11?4.   0.985      271.  5.169  1107.   0.257      70.   1.328   284.
4 16 HG       223.  2.101  13.62  1??4.   0.973      219.  2.043  1852.   0.089      19.   0.182   165.
5 19 HG       210.  2.270  13.41   876.   0.981      206.  2.227   879.   0.047      10.   0.105    41.
6 16 HG       221.  2.702  13.20  184?.   0.980      217.  2.649  1812.   0.089      19.   0.236   161.
7  3 HG       217.  4.625  12.30  18??.   0.971      213.  4.492  1756.   0.283      60.   1.271   497.
8 16 HG       236.  2.103  13.?6  19?3.   1.010      238.  2.124  1972.   0.089      21.   0.1?9   176.
9 IDLE       3349.  5.203   6.43   159.   1.144     3833.  5.954   193.   0.021   [illegible]  [illegible]     4.
                                                  ------(CYCLE COMPOSITE)--------  [illegible]  [illegible]  1486.
CYCLE 3
1 IDLE        407.  6.486   8.37    54.   1.203      490.  7.803    65.   0.036      18.   0.281     2.
2 16 HG       246.  2.372  13.40  1727.   0.976      240.  2.315  1685.   0.089      21.   0.206   150.
3 10 HG       271.  5.137  11.83  1136.   0.985      267.  5.060  1139.   0.257      69.   1.300   293.
4 16 HG       224.  2.064  13.60  1?97.   0.974      21?.  2.011  1849.   0.089      19.   0.1?1   165.
5 19 HG       210.  2.521  13.33   901.   0.976      211.  2.467   882.   0.047      10.  [illegible]    41.
6 16 HG       220.  2.403  13.41  [illegible]   0.976      215.  2.348  1865.   0.089      19.   0.209   166.
7  3 HG       222.  4.649  12.35  17??.   0.973      216.  4.521  1697.   0.283      61.   1.279   480.
8 16 HG       223.  2.012  13.39  1?5?.   0.990      223.  1.991  1836.   0.089   [illegible]   0.177   163.
9 IDLE       3320.  5.179   6.43   163.   1.149     3825.  5.951   187.   0.021   [illegible]   0.123     4.
                                                  ------(CYCLE COMPOSITE)--------    317.   3.852  1464.
CYCLE 4
1 IDLE        407.  6.486   8.37    54.   1.203      490.  7.803    65.   0.036      18.   0.281     2.
2 16 HG       24?.  2.302  13.2?  1666.   0.986      243.  2.271  1643.   0.089      22.   0.202   146.
3 10 HG       274.  5.001  11.59  1131.   1.008      276.  5.043  1109.   0.257      71.   1.296   285.
4 16 HG       22?.  2.327  13.40  1829.   [illegible]      222.  2.008  1810.   0.089      20.   0.179   161.
5 19 HG       218.  2.31?  13.21   851.   [illegible]      216.  2.297   851.   0.047      10.   0.108    40.
6 16 HG       222.  2.371  13.17  1836.   0.993      220.  2.355  1823.   0.089      20.   0.210   162.
7  3 HG       27?.  4.402  12.11  1731.   0.997      283.  4.387  1725.   0.283      80.   1.242   488.
8 16 HG       213.  2.070  13.36  1834.   0.990      213.  2.049  1815.   0.089      19.   0.182   162.
9 IDLE       3285.  4.963   6.36   170.   1.166     3838.  5.799   199.   0.021      81.   0.122     4.
                                                  ------(CYCLE COMPOSITE)--------    324.   3.422  1450.



AVERAGE SUM-COMPOSITE VALUES FOR CYCLES 1&2    314.   3.869  1490.

AVERAGE SUM-COMPOSITE VALUES FOR CYCLES 3&4    321.   3.851  1457.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC     0.35*( 314.) + 0.65*( 321.) =   319.     PPM

 CO     0.35*( 3.869) + 0.65*( 3.851) =      3.857 PERCENT

NO(X)   0.35*( 1490.) + 0.65*( 1457.) =  1469.     PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+11.6*HC)

NO HUMIDITY CORRECTION FACTOR (K) =   1.069

CORRECTED NO = 1570 PPM
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TRUCK G-4

1969 CHEVROLET 18000 LB GVW VAN
WITH 350 CID V8 ENGINE

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1969 CHEV, WITH 350 CID V8, TRUCK G-4  8/20/74 RUN 1                     K =1.000     HUM =  75  GR/LB
-------------------------------------------------------------------------------------------------------------
FEDERAL       CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D   WEIGHTING      W E I G H T E D
MODE           HC     CO     CO2     NO     FACTOR     HC     CO    NO     FACTOR      HC      CO       NO
-------------------------------------------------------------------------------------------------------------
CYCLE 1
        1 IDLE      1306  7.822   3.720     64     1.604      2094 12.546    103       .036      75.400    .452     3.695
        2 16'HG      334  3.528  11.770    693     1.044       349  3.682    723       .089      31.021    .328    64.364
        3 10'HG      287  2.062  13.580   1985      .972       279  2.004   1929       .257      71.678    .515   495.752
        4 16'HG      270  3.481  11.900    769     1.041       281  3.623    800       .089      25.010    .322    71.231
        5 19'HG      231  3.047  11.870    292     1.063       246  3.238    310       .047      11.539    .152    14.586
        6 16'HG      249  3.349  11.900    759     1.047       261  3.507    795       .089      23.213    .312    70.757
        7  3'HG      324  7.470  10.550    399      .991       321  7.403    395       .283      90.837   2.095   111.865
        8 16'HG      240  3.407  12.100    721     1.031       247  3.513    743       .089      22.024    .313    66.164
        9 C.T.      4406  3.613   2.660    128     1.572      6925  5.679    201       .021     145.434    .119     4.225
        SUM------------(CYCLE COMPOSITE)------------------------------------------------------  496.157   4.608   902.640
CYCLE 2
        1 IDLE      1306  7.822   3.720     64     1.604      2094 12.546    103       .036      75.400    .452     3.695
        2 16'HG      396  3.339  11.860    726     1.039       411  3.469    754       .089      36.615    .309    67.127
        3 10'HG      334  1.989  13.600   1975      .970       324  1.928   1915       .257      83.225    .496   492.125
        4 16'HG      319  3.595  11.980    766     1.027       328  3.691    787       .089      29.151    .329    69.999
        5 19'HG      289  3.033  11.970    319     1.051       304  3.187    335       .047      14.273    .150    15.755
        6 16'HG      297  3.480  11.940    768     1.036       308  3.604    795       .089      27.376    .321    70.789
        7  3'HG      360  7.355  10.590    413      .989       356  7.277    409       .283     100.799   2.059   115.633
        8 16'HG      268  3.254  12.170    772     1.029       276  3.350    795       .089      24.552    .298    70.725
        9 C.T.      4379  3.535   2.590    125     1.596      6988  5.641    199       .021     146.741    .118     4.189
        SUM------------(CYCLE COMPOSITE)------------------------------------------------------  538.127   4.531   910.037
CYCLE 3
        1 IDLE      1232  6.571   3.890     48     1.705      2100 11.201     82       .036      75.605    .403     2.946
        2 16'HG      337  3.388  11.910    652     1.038       350  3.517    677       .089      31.135    .313    60.238
        3 10'HG      294  2.035  13.600   1944      .971       285  1.976   1887       .257      73.357    .508   485.056
        4 16'HG      280  3.496  11.790    707     1.048       293  3.663    741       .089      26.108    .326    65.922
        5 19'HG      261  2.782  12.080    323     1.054       275  2.933    341       .047      12.933    .138    16.006
        6 16'HG      271  3.466  11.820    703     1.047       284  3.630    736       .089      25.259    .323    65.529
        7  3'HG      341  7.398  10.560    407      .991       338  7.331    404       .283      95.676   2.075   114.194
        8 16'HG      250  3.287  12.070    711     1.037       259  3.408    737       .089      23.072    .303    65.616
        9 C.T.      4194  3.591   2.650    120     1.616      6776  5.802    194       .021     142.292    .122     4.071
        SUM------------(CYCLE COMPOSITE)------------------------------------------------------  505.438   4.511   879.573
CYCLE 4
        1 IDLE      1232  6.571   3.890     48     1.705      2100 11.201     82       .036      75.605    .403     2.946
        2 16'HG      259  3.086  12.100    724     1.041       270  3.214    754       .089      24.007    .286    67.108
        3 10'HG      241  2.075  13.520   1874      .979       236  2.030   1834       .257      60.609    .522   471.289
        4 16'HG      239  3.421  11.830    675     1.051       251  3.595    709       .089      22.352    .320    63.129
        5 19'HG      212  2.849  12.020    365     1.060       225  3.021    387       .047      10.566    .142    18.192
        6 16'HG      233  3.426  11.980    744     1.040       242  3.562    774       .089      21.563    .317    68.853
        7  3'HG      313  7.450  10.550    408      .992       311  7.392    405       .283      87.894   2.092   114.571
        8 16'HG      228  3.164  12.230    762     1.031       235  3.263    786       .089      20.930    .290    69.949
        9 C.T.      4084  3.548   2.720    133     1.619      6613  5.745    215       .021     138.874    .121     4.523
        SUM------------(CYCLE COMPOSITE)------------------------------------------------------  462.400   4.493   880.559

        AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)-----------------------------------  517.142   4.569   906.338

        AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)-----------------------------------  483.919   4.502   880.066

        FOUR CYCLE COMPOSITE - REPORTED VALUES =    HC    0.35*(  517.142) + 0.65*(  483.919) =   495.547  PPM
                                                    CO    0.35*(    4.569) + 0.65*(    4.502) =     4.526  PERCENT
                                                    NO    0.35*(  906.338) + 0.65*(  880.066) =   889.261  PPM
                                                                                CORRECTED NO =   889.217  PPM

        DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)
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         1969 CHEV. WITH 350 CID V8, TRUCK G-4  8/20/74 RUN 2                      K = .989     HUM =  72  GR/LB
         -----------------------------------------------------------------------------------------------------------------
         FEDERAL       CONCENTRATION  AS  MEASURED  DILUTION     A D J U S T E D   WEIGHTING        W E I G H T E D
         MODE            HC     CO    CO2    NO      FACTOR     HC     CO    NO      FACTOR        HC        CO        NO
         -----------------------------------------------------------------------------------------------------------------
CYCLE 1
         1 IDLE        1356  7.947   3.800     44     1.570    2128 12.474    69      .036       76.622     .449     2.486
         2 16'HG        356  3.469  11.990    736     1.028     366  3.565   756      .089       32.562     .317    67.319
         3 10'HG        271  1.722  13.810   2093      .969     263  1.669  2028      .257       67.489     .429   521.233
         4 16'HG        255  3.211  12.270    849     1.025     261  3.290   870      .089       23.255     .293    77.425
         5 19'HG        216  2.495  12.440    385     1.042     225  2.599   401      .047       10.574     .122    18.848
         6 16'HG        243  3.281  12.090    821     1.036     252  3.400   851      .089       22.411     .303    75.717
         7  3'HG        321  7.362  10.720    450      .983     316  7.238   442      .283       89.317    2.048   125.211
         8 16'HG        228  3.061  12.270    753     1.032     235  3.160   777      .089       20.947     .281    69.180
         9 C.T.        3910  3.805   2.800    117     1.625    6352  6.182   190      .021      133.396     .130     3.992
         SUM------------(CYCLE COMPOSITE)-------------------------------------------------   476.573    4.372   961.411
CYCLE 2
         1 IDLE        1356  7.947   3.800     44     1.570    2128 12.474    69      .036       76.622     .449     2.486
         2 16'HG        304  3.081  12.150    701     1.034     314  3.187   725      .089       27.985     .284    64.530
         3 10'HG        264  1.985  13.700   2073      .968     256  1.922  2007      .257       65.684     .494   515.772
         4 16'HG        247  3.354  12.100    814     1.032     255  3.463   840      .089       22.697     .308    74.800
         5 19'HG        217  2.629  12.320    372     1.046     227  2.749   389      .047       10.667     .129    18.280
         6 16'HG        236  3.316  12.110    759     1.034     244  3.429   785      .089       21.719     .305    69.849
         7  3'HG        318  7.432  10.650    439      .986     313  7.326   433      .283       88.713    2.073   122.468
         8 16'HG        230  3.167  12.450    843     1.015     234  3.215   856      .089       20.703     .286    76.173
         9 C.T.        3887  3.756   2.810    136     1.632    6343  6.129   222      .021      133.198     .129     4.660
         SUM------------(CYCLE COMPOSITE)-------------------------------------------------   468.063    4.957   949.018
CYCLE 3
         1 IDLE        1147  6.529   3.970     45     1.711    1963 11.173    77      .036       70.662     .402     2.772
         2 16'HG        280  2.975  11.850    802     1.063     298  3.163   853      .089       26.491     .281    75.879
         3 10'HG        246  1.949  13.470   2007      .986     242  1.921  1978      .257       62.319     .494   508.429
         4 16'HG        233  3.239  11.800    737     1.061     247  3.435   782      .089       21.999     .306    69.570
         5 19'HG        215  2.611  11.810    360     1.086     234  2.836   391      .047       10.977     .133    18.381
         6 16'HG        230  3.126  11.830    750     1.063     244  3.323   797      .089       21.750     .296    70.951
         7  3'HG        305  6.961  10.690    462     1.003     306  6.985   464      .283       86.619    1.977   131.199
         8 16'HG        214  2.730  12.290    846     1.044     223  2.851   883      .089       19.888     .254    78.623
         9 C.T.        3797  3.684   2.830    131     1.653    6276  6.089   217      .021      131.793     .128     4.547
         SUM------------(CYCLE COMPOSITE)-------------------------------------------------   452.497    4.271   960.351
CYCLE 4
         1 IDLE        1147  6.529   3.970     45     1.711    1963 11.173    77      .036       70.662     .402     2.772
         2 16'HG        207  2.638  12.000    772     1.071     222  2.825   827      .089       19.725     .251    73.566
         3 10'HG        213  1.627  13.560   2124      .993     211  1.615  2109      .257       54.353     .415   541.998
         4 16'HG        203  3.057  11.820    798     1.069     217  3.267   853      .089       19.300     .291    75.902
         5 19'HG        176  2.323  11.980    339     1.088     191  2.527   363      .047        8.997     .119    17.074
         6 16'HG        208  3.122  11.860    843     1.063     221  3.317   896      .089       19.671     .295    79.729
         7  3'HG        296  7.214  10.510    414     1.004     297  7.249   416      .283       84.121    2.052   117.656
         8 16'HG  [illegible]  3.025  11.960    822     1.059     210  3.203   870      .089       19.412     .285    77.958
         9 C.T.        3644  3.744   2.926    129     1.651    6100  6.182   213      .021      128.090     .130     4.473
         SUM------------(CYCLE COMPOSITE)-------------------------------------------------   424.339    4.240   990.623

         AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)------------------------------   472.318    4.915   955.215

         AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)------------------------------   438.418    4.255   975.487

         FOUR CYCLE COMPOSITE - REPORTED VALUES -    HC    0.35*(  472.318) + 0.65*(  438.418) =   450.283  PPM
                                                     CO    0.35*(    4.915) + 0.65*(    4.255) =     4.311  PERCENT
                                                     NO    0.35*(  955.215) + 0.65*(  975.487) =   968.392  PPM
                                                                                   CORRECTED NO =   957.586  PPM

         DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)
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TRUCK G-5

1967 DODGE 19500 LB GVW STAKE BODY
WITH 318 CID V8 ENGINE

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1967 DODGE WITH 318 CID V8, TRUCK G-5 8/28/74 RUN 4                   K =1.028     HUM =  83  GR/LB
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FEDERAL         CONCENTRATION  AS  MEASURED  DILUTION     A D J U S T E D    WEIGHTING     W E I G H T E D
MODE              HC      CO     CO2     NO    FACTOR     HC     CO     NO      FACTOR     HC       CO        NO
-------------------------------------------------------------------------------------------------------
CYCLE 1
        1 IDLE    938   7.848   8.550     58    1.075    1008   8.437    62     .036    36.304    .304     2.245
        2 16'HG   361   3.393  12.450   1212     .997     360   3.385  1209     .089    32.049    .301   107.598
        3 10'HG   256   2.160  13.260   2462     .992     254   2.143  2442     .257    65.268    .551   627.692
        4 16'HG   302   3.537  12.560   1119     .989     299   3.500  1107     .089    26.594    .311    98.590
        5 19'HG   380   3.870  12.290    453     .991     376   3.834   449     .047    17.695    .180    21.099
        6 16'HG   322   3.311  12.740   1177     .984     317   3.256  1158     .089    28.185    .290   103.025
        7  3'HG   303   7.260  10.310    378    1.016     308   7.381   384     .283    87.136   2.089   108.709
        8 16'HG   361   3.359  12.580   1127     .990     357   3.325  1116     .089    31.801    .296    99.280
        9 C.T.   7780   3.013   2.730    165    1.147    8926   3.457   189     .021   187.438    .073     3.975
        SUM-------------(CYCLE COMPOSITE)--------------------------------------------  512.470   4.395  1172.153
CYCLE 2
        1 IDLE    938   7.848   8.550     58    1.075    1008   8.437    62     .036    36.304    .304     2.245
        2 16'HG   628   3.418  12.630   1161     .966     606   3.300  1121     .089    53.967    .294    99.770
        3 10'HG   468   1.827  13.430   2676     .977     457   1.784  2613     .257   117.460    .459   671.571
        4 16'HG   507   3.277  12.800   1296     .968     491   3.171  1254     .089    43.659    .282   111.603
        5 19'HG   679   3.708  12.470    506     .963     654   3.571   487     .047    30.732    .168    22.902
        6 16'HG   517   3.270  12.790   1226     .968     500   3.165  1186     .089    44.529    .282   105.594
        7  3'HG   488   7.323  10.260    376    1.004     490   7.349   377     .283   138.596   2.080   106.787
        8 16'HG   547   3.318  12.720   1292     .968     529   3.212  1251     .089    47.124    .286   111.305
        9 C.T.   7671   3.035   2.750    184    1.155    8861   3.506   213     .021   186.084    .074     4.464
        SUM-------------(CYCLE COMPOSITE)--------------------------------------------  698.449   4.227  1236.240
CYCLE 3
        1 IDLE   1620   7.728   8.570     65    1.022    1656   7.900    66     .036    59.621    .284     2.392
        2 16'HG   493   3.435  12.650   1176     .973     480   3.343  1144     .089    42.699    .298   101.855
        3 10'HG   404   1.870  13.640   2678     .966     390   1.806  2587     .257   100.291    .464   664.803
        4 16'HG   419   3.320  12.420   1219     .998     418   3.313  1216     .089    37.200    .295   108.248
        5 19'HG   407   3.620  12.890    479     .958     390   3.467   459     .047    18.321    .163    21.562
        6 16'HG   387   3.164  12.840   1341     .977     378   3.092  1310     .089    33.654    .275   116.615
        7  3'HG   379   7.342  10.190    369    1.016     385   7.460   375     .283   108.983   2.111   106.108
        8 16'HG   357   3.380  12.640   1200     .985     352   3.330  1182     .089    31.308    .296   105.236
        9 C.T.   7981   3.168   2.550    134    1.137    9074   3.602   152     .021   190.553    .076     3.199
        SUM-------------(CYCLE COMPOSITE)--------------------------------------------  622.638   4.262  1230.017
CYCLE 4
        1 IDLE   1620   7.728   8.570     65    1.022    1656   7.900    66     .036    59.621    .284     2.392
        2 16'HG   458   3.412  12.670   1186     .975     447   3.327  1156     .089    39.746    .296   102.923
        3 10'HG   342   1.884  13.410   2608     .985     337   1.856  2569     .257    86.572    .477   660.170
        4 16'HG   424   3.300  12.730   1248     .977     414   3.228  1220     .089    36.877    .287   108.542
        5 19'HG   419   3.863  12.270    588     .989     415   3.822   582     .047    19.486    .180    27.346
        6 16'HG   380   3.199  12.840   1329     .976     371   3.124  1298     .089    33.023    .278   115.494
        7  3'HG   380   7.466  10.160    368    1.014     385   7.569   373     .283   109.018   2.142   105.575
        8 16'HG   352   3.460  12.600   1178     .986     347   3.411  1161     .089    30.880    .304   103.349
        9 C.T.   7356   3.100   2.830    185    1.177    8654   3.647   218     .021   181.744    .077     4.571
        SUM-------------(CYCLE COMPOSITE)------------------------------------------ ---  596.968   4.324  1230.365

        AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)--------------------------  605.459   4.311  1204.196

        AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)--------------------------  609.803   4.293  1230.191

        FOUR CYCLE COMPOSITE - REPORTED VALUES -   HC   0.35*(  605.459) + 0.65*(  609.803) =   608.283  PPM
                                                   CO   0.35*(    4.311) + 0.65*(    4.293) =     4.299  PERCENT
                                                   NO   0.35*( 1204.196) + 0.65*( 1230.191) =  1221.093  PPM
                                                                              CORRECTED NO =  1255.313  PPM

        DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.5*HC)
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BK-CVS TK G-5 ST. HOSP. M-97 67 DODGE GVW 19500 8/28/74 RUN 5 3:30PM
ODOM. 39,050 318 V8 12*BTDC 0500 RPM 20* W/D 78/66 BARR. 29.14 CORR.
PAGE 2
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FEDERAL      CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D   WEIGHTING    W E I G H T E D
MODE          HC      CO     CO2   NO(K)    FACTOR     HC       CO  NO(K)   FACTOR     HC     CO     NO(K)
------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE       1160.   7.732   8.81     60.    1.041    1207.   8.048    62.   0.036      43.  0.290     2.
2 16 HG       272.   3.120  13.28   1246.    0.953     261.   2.990  1194.   0.089      23.  0.266   106.
3 10 HG       239.   2.097  13.66   2571.    0.969     231.   2.031  2490.   0.257      59.  0.522   640.
4 16 HG       287.   3.245  13.35   1311.    0.949     272.   3.079  1244.   0.089      24.  0.274   111.
5 19 HG       313.   3.632  13.12    632.    0.949     297.   3.447   600.   0.047      14.  0.160    28.
6 16 HG       293.   3.142  13.40   1288.    0.948     278.   2.980  1221.   0.089      25.  0.265   109.
7  3 HG       289.   6.965  10.69    427.    1.001     289.   6.975   428.   0.283      82.  1.974   121.
8 16 HG       282.   3.075  13.42   1414.    0.950     268.   2.922  1344.   0.089      24.  0.260   120.
9 C.T.       8071.   3.105   2.92    185.    1.099    8873.   3.413   203.   0.021     186.  0.072     4.
                                                     -----(CYCLE COMPOSITE)-------     480.  4.083  1241.
CYCLE 2
1 IDLE       1160.   7.732   8.81     60.    1.041    1207.   8.048    62.   0.036      43.  0.290     2.
2 16 HG       415.   3.190  13.36   1240.    0.941     390.   3.002  1167.   0.089      35.  0.267   104.
3 10 HG       298.   1.951  13.76   2670.    0.963     287.   1.878  2571.   0.257      74.  0.483   661.
4 16 HG       330.   3.106  13.44   1378.    0.945     312.   2.934  1302.   0.089      28.  0.261   116.
5 19 HG       336.   3.480  13.24    633.    0.945     318.   3.289   598.   0.047      15.  0.155    28.
6 16 HG       322.   3.104  13.44   1299.    0.945     304.   2.934  1228.   0.089      27.  0.261   109.
7  3 HG       315.   7.004  10.68    434.    0.999     315.   6.994   433.   0.283      89.  1.979   123.
8 16 HG       306.   3.136  13.39   1377.    0.948     290.   2.974  1306.   0.089      26.  0.265   116.
9 C.T.       7815.   3.093   2.96    197.    1.120    8750.   3.463   221.   0.021     184.  0.073     5.
                                                     -----(CYCLE COMPOSITE)-------     521.  4.034  1264.
CYCLE 3
1 IDLE       1497.   7.357   9.11     96.    1.006    1506.   7.403    97.   0.036      54.  0.267     3.
2 16 HG       399.   3.198  13.33   1277.    0.944     377.   3.019  1206.   0.089      34.  0.269   107.
3 10 HG       305.   1.819  13.87   2769.    0.960     293.   1.746  2657.   0.257      75.  0.449   683.
4 16 HG       340.   3.132  13.42   1402.    0.944     321.   2.957  1324.   0.089      29.  0.263   118.
5 19 HG       347.   3.583  13.15    680.    0.947     329.   3.393   644.   0.047      15.  0.159    30.
6 16 HG       331.   3.094  13.42   1307.    0.946     313.   2.926  1236.   0.089      28.  0.260   110.
7  3 HG       321.   7.081  10.66    438.    0.997     320.   7.057   436.   0.283      91.  1.997   123.
8 16 HG       308.   3.062  13.45   1471.    0.947     292.   2.900  1393.   0.089      26.  0.258   124.
9 C.T.       7753.   3.040   2.92    219.    1.132    8776.   3.441   248.   0.021     184.  0.072     5.
                                                     -----(CYCLE COMPOSITE)-------     536.  3.994  1303.
CYCLE 4
1 IDLE       1497.   7.357   9.11     96.    1.006    1506.   7.403    97.   0.036      54.  0.267     3.
2 16 HG       408.   3.210  13.38   1301.    0.940     383.   3.017  1223.   0.089      34.  0.269   109.
3 10 HG       294.   1.743  13.88   2809.    0.962     283.   1.677  2703.   0.257      73.  0.431   695.
4 16 HG       328.   3.132  13.42   1407.    0.945     310.   2.960  1330.   0.089      28.  0.263   118.
5 19 HG       331.   3.443  13.23    675.    0.947     313.   3.261   639.   0.047      15.  0.153    30.
6 16 HG       321.   2.981  13.48   1437.    0.946     304.   2.821  1360.   0.089      27.  0.251   121.
7  3 HG       313.   6.974  10.67    465.    1.000     313.   6.974   465.   0.283      89.  1.974   132.
8 16 HG       306.   3.116  13.41   1458.    0.948     290.   2.953  1382.   0.089      26.  0.263   123.
9 C.T.       7618.   3.072   2.94    233.    1.141    8691.   3.505   266.   0.021     183.  0.074     6.
                                                     -----(CYCLE COMPOSITE)-------     529.  3.945  1337.


AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   501.  4.059  1253.

AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   533.  3.970  1320.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC     0.35*(  507.) + 0.65*(  533.) =   522.    PPM

 CO     0.35*( 4.059) + 0.65*( 3.970) =     4.002 PERCENT

NO(K)   0.35*( 1253.) + 0.65*( 1320.) =  1297.    PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

NO HUMIDITY CORRECTION FACTOR (K) =  1.004

CORRECTED NO = 1302 PPM
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TRUCK G-6

1968 IHC 27500 LB GVW DUMP BODY WITH 345 CID V8 ENGINE

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BK-CVS TK G-6 CITY 1215 69 IHC GVW 27500 9/9/74 RUN 1 1400
ODOM. 56461 345 V-8 0* TDC*500 RPM 30* W/D 64/73 29.020 72 CORR.
PAGE 2
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FEDERAL     CONCENTRATION  AS   MEASURED  DILUTION   A D J U S T E D    WEIGHTING   W E I G H T E D
MODE         HC     CO    CO2    NO(K)     FACTOR   HC      CO  NO(K)    FACTOR    HC     CO   NO(K)
-----------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE      453.  2.165  11.52     70.     1.108    502.  2.398    78.   0.036     10.  0.086     3.
2 16 HG     153.  0.498  14.00    492.     1.006    154.  0.501   495.   0.089     14.  0.045    44.
3 10 HG     141.  0.561  14.10   1465.     0.998    141.  0.560  1462.   0.257     36.  0.144   376.
4 16 HG     115.  0.453  14.13    581.     1.001    115.  0.454   582.   0.089     10.  0.040    52.
5 19 HG     107.  0.424  14.05    252.     1.008    108.  0.428   254.   0.047      5.  0.020    12.
6 16 HG     104.  0.470  14.13    504.     1.001    104.  0.471   505.   0.089      9.  0.042    45.
7  3 HG     129.  1.949  13.91   1053.     0.965    125.  1.882  1017.   0.283     35.  0.533   288.
8 16 HG     103.  0.502  14.17    631.     0.998    103.  0.501   630.   0.089      9.  0.045    56.
9 C.T.     1244.  1.480   8.48     71.     1.373   1706.  2.032    97.   0.021     36.  0.043     2.
                                                 -----(CYCLE COMPOSITE)-------    172.  0.998   878.
CYCLE 2
1 IDLE      453.  2.165  11.52     70.     1.108    502.  2.398    78.   0.036     18.  0.086     3.
2 16 HG     151.  0.565  14.06    471.     1.000    151.  0.565   471.   0.089     13.  0.050    42.
3 10 HG     133.  0.426  14.15   1309.     1.000    133.  0.426  1309.   0.257     34.  0.109   336.
4 16 HG     113.  0.424  14.11    538.     1.004    113.  0.426   540.   0.089     10.  0.038    48.
5 19 HG     104.  0.373  14.06    219.     1.010    105.  0.377   221.   0.047      5.  0.018    10.
6 16 HG     103.  0.440  14.10    477.     1.005    103.  0.442   479.   0.089      9.  0.039    43.
7  3 HG     129.  1.892  13.96   1061.     0.963    124.  1.823  1022.   0.283     35.  0.516   289.
8 16 HG     100.  0.455  14.14    602.     1.001    100.  0.456   603.   0.089      9.  0.041    54.
9 C.T.     1217.  1.413   8.35     69.     1.398   1702.  1.976    96.   0.021     36.  0.041     2.
                                                 -----(CYCLE COMPOSITE)-------    169.  0.938   827.
CYCLE 3
1 IDLE      454.  1.496  11.84     63.     1.109    503.  1.658    70.   0.036     18.  0.060     3.
2 16 HG     141.  0.476  14.05    433.     1.004    142.  0.478   435.   0.089     13.  0.043    39.
3 10 HG     127.  0.460  14.12   1298.     1.001    127.  0.460  1299.   0.257     33.  0.118   334.
4 16 HG     106.  0.415  14.08    511.     1.007    107.  0.418   515.   0.089     10.  0.037    46.
5 19 HG      99.  0.357  14.01    217.     1.014    100.  0.362   220.   0.047      5.  0.017    10.
6 16 HG     100.  0.447  14.09    498.     1.006    101.  0.449   501.   0.089      9.  0.040    45.
7  3 HG     128.  1.965  13.92   1071.     0.964    123.  1.894  1033.   0.283     35.  0.536   292.
8 16 HG      97.  0.435  14.13    616.     1.005     97.  0.437   619.   0.089      9.  0.036    55.
9 C.T.     1132.  1.256   8.45     69.     1.408   1594.  1.768    97.   0.021     33.  0.037     2.
                                                 -----(CYCLE COMPOSITE)-------    165.  0.924   826.
CYCLE 4
1 IDLE      454.  1.496  11.84     63.     1.109    503.  1.658    70.   0.036     18.  0.060     3.
2 16 HG     145.  0.538  14.03    477.     1.003    145.  0.539   478.   0.089     13.  0.048    43.
3 10 HG     126.  0.416  14.14   1278.     1.001    126.  0.416  1279.   0.257     32.  0.107   329.
4 16 HG     107.  0.401  14.09    489.     1.006    108.  0.404   492.   0.089     10.  0.036    44.
5 19 HG      98.  0.284  14.08    221.     1.012     99.  0.287   224.   0.047      5.  0.013    11.
6 16 HG      98.  0.388  14.09    474.     1.008     99.  0.391   478.   0.089      9.  0.035    43.
7  3 HG     125.  1.916  13.95   1074.     0.963    120.  1.846  1035.   0.283     34.  0.522   293.
8 16 HG      95.  0.430  14.13    559.     1.003     95.  0.431   561.   0.089      8.  0.038    50.
9 C.T.     1118.  1.103   8.41     66.     1.426   1594.  1.573    94.   0.021     33.  0.033     2.
                                                ------(CYCLE COMPOSITE)-------    162.  0.892   818.


          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   171.  0.968   853.

          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   164.  0.908   822.

          FOUR CYCLE COMPOSITE - REPORTED VALUE

           HC     0.35*( 171.) + 0.65*( 164.) =   167.    PPM

           CO     0.35*( 0.968) + 0.65*( 0.908) =    0.929 PERCENT

          NO(K)  0.35*( 853.) + 0.65*( 822.) =   833.    PPM

          DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

          NO HUMIDITY CORRECTION FACTOR (K) =   1.00

          CORRECTED NO = 833 PPM
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BK-CVS TK G-6 CITY 1215 68 IHC GVW 27500 9/9/74 RUN 2 1600
ODOM. 56461 345 V-8 8* TDC@500 RPM 30* W/D 58/74 29.00 CORR.
PAGE 2
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FEDERAL      CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D   WEIGHTING    W E I G H T E D
MODE          HC      CO    CO2   NO(K)    FACTOR     HC      CO  NO(K)  FACTOR      HC     CO    NO(K)
------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE       311.   2.160  11.49    78.    1.123     349.   2.426   88.  0.036      13.  0.087     3.
2 16 HG      120.   0.447  13.87   567.    1.020     122.   0.456  578.  0.089      11.  0.041    51.
3 10 HG      107.   0.440  14.02  1424.    1.010     108.   0.446 1438.  0.257      28.  0.115   370.
4 16 HG       90.   0.440  14.03   646.    1.010      91.   0.445  653.  0.089       8.  0.040    58.
5 19 HG       88.   0.423  13.96   263.    1.016      89.   0.430  267.  0.047       4.  0.020    13.
6 16 HG       86.   0.466  14.00   606.    1.013      87.   0.472  614.  0.089       8.  0.042    55.
7  3 HG      108.   1.888  13.83  1190.    0.974     105.   1.839 1159.  0.283      30.  0.520   328.
8 16 HG       83.   0.442  14.06   694.    1.009      84.   0.446  700.  0.089       7.  0.040    62.
9 C.T.      1459.   1.889   8.50    95.    1.316    1920.   2.486  125.  0.021      40.  0.052     3.
                                                  ------(CYCLE COMPOSITE)-------  149.  0.957   943.
CYCLE 2
1 IDLE       311.   2.160  11.49    78.    1.123     349.   2.426   88.  0.036      13.  0.087     3.
2 16 HG      125.   0.461  13.99   562.    1.010     126.   0.465  567.  0.089      11.  0.041    50.
3 10 HG      114.   0.444  14.10  1533.    1.004     114.   0.446 1539.  0.257      29.  0.115   396.
4 16 HG       93.   0.408  14.05   643.    1.010      94.   0.412  650.  0.089       8.  0.037    58.
5 19 HG       89.   0.503  14.04   272.    1.008      90.   0.507  274.  0.047       4.  0.024    13.
6 16 HG       88.   0.436  14.04   577.    1.010      89.   0.440  583.  0.089       8.  0.039    52.
7  3 HG      111.   1.937  13.87  1191.    0.969     108.   1.877 1154.  0.283      31.  0.531   327.
8 16 HG       86.   0.450  14.08   731.    1.007      87.   0.453  736.  0.089       8.  0.040    66.
9 C.T.      1440.   1.712   8.56    96.    1.321    1902.   2.261  127.  0.021      40.  0.047     3.
                                                  ------(CYCLE COMPOSITE)-------  152.  0.961   968.
CYCLE 3
1 IDLE       427.   1.582  11.62    93.    1.127     481.   1.782  105.  0.036      17.  0.064     4.
2 16 HG      136.   0.495  13.95   564.    1.010     137.   0.500  570.  0.089      12.  0.045    51.
3 10 HG      118.   0.420  14.03  1444.    1.009     119.   0.424 1457.  0.257      31.  0.109   374.
4 16 HG       98.   0.396  14.02   655.    1.012      99.   0.401  663.  0.089       9.  0.036    59.
5 19 HG      112.   0.470  13.94   255.    1.014     114.   0.477  259.  0.047       5.  0.022    12.
6 16 HG       91.   0.390  14.00   620.    1.014      92.   0.395  629.  0.089       8.  0.035    56.
7  3 HG      114.   1.866  13.85  1193.    0.973     111.   1.816 1161.  0.283      31.  0.514   329.
8 16 HG       88.   0.423  14.04   703.    1.010      89.   0.427  710.  0.089       8.  0.038    63.
9 C.T.      1236.   1.462   8.58   100.    1.363    1684.   1.992  136.  0.021      35.  0.042     3.
                                                  ------(CYCLE COMPOSITE)-------  156.  0.905   951.
CYCLE 4
1 IDLE       427.   1.582  11.62    93.    1.127     481.   1.782  105.  0.036      17.  0.064     4.
2 16 HG      134.   0.417  13.91   601.    1.017     136.   0.424  611.  0.089      12.  0.038    54.
3 10 HG      117.   0.405  14.04  1530.    1.009     118.   0.409 1544.  0.257      30.  0.105   397.
4 16 HG       94.   0.565  13.99   602.    1.009      95.   0.570  607.  0.089       8.  0.051    54.
5 19 HG       88.   0.316  13.92   268.    1.023      90.   0.323  274.  0.047       4.  0.015    13.
6 16 HG       88.   0.393  14.01   610.    1.013      89.   0.398  618.  0.089       8.  0.035    55.
7  3 HG      114.   1.857  13.87  1214.    0.972     111.   1.805 1180.  0.283      31.  0.511   334.
8 16 HG       85.   0.429  14.03   676.    1.010      86.   0.433  683.  0.089       8.  0.039    61.
9 C.T.      1076.   1.215   8.52   107.    1.409    1516.   1.712  151.  0.021      32.  0.036     3.
                                                  ------(CYCLE COMPOSITE)-------  158.  0.894   975.


            AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   151.  0.959   956.

            AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   153.  0.900   963.

            FOUR CYCLE COMPOSITE - REPORTED VALUE

             HC     0.35*(  151.) + 0.65*(  153.) =   152.    PPM

             CO     0.35*( 0.959) + 0.65*( 0.900) =     0.921 PERCENT

            NO(K)   0.35*(  956.) + 0.65*(  963.) =   961.    PPM

            DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

            NO HUMIDITY CORRECTION FACTOR (K) =   0.898

            CORRECTED NO = 863 PPM
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TRUCK G-7

1965 CHEVROLET 19500 LB GVW VAN
WITH 292 CID I6 ENGINE

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BK-CVS TK G-7 BASSE 169 65 CHEVROLET GVW 19500 9/17/74 RUN 1 4:00 PM
ODOM. 46406 292 I-6 4*BTDC*500 RPM 32* W/D 70/80 29.15 CORR. *76*
PAGE 2
--------------------------------------------------------------------------------------------------------------
FEDERAL      CONCENTRATION  AS   MEASURED  DILUTION    A D J U S T E D   WEIGHTING    W E I G H T E D
MODE           HC      CO    CO2    NO(K)    FACTOR    HC      CO   NO(K)  FACTOR      HC     CO     NO(K)
--------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        471.   5.402   8.03     44.    1.290    608.  6.969    57.  0.036       22.  0.251      2.
2 16 HG       308.   2.502  12.61   1176.    1.022    315.  2.556  1203.  0.089       28.  0.227    107.
3 10 HG       253.   2.856  12.85   1712.    0.997    252.  2.846  1706.  0.257       65.  0.731    438.
4 16 HG       244.   2.381  12.80   1372.    1.018    248.  2.423  1396.  0.089       22.  0.216    124.
5 19 HG       230.   1.869  13.01    484.    1.022    235.  1.910   495.  0.047       11.  0.090     23.
6 16 HG       240.   1.995  13.13   1447.    1.008    242.  2.010  1458.  0.089       22.  0.179    130.
7  3 HG       285.   8.833   9.34    321.    1.031    294.  9.103   331.  0.283       83.  2.576     94.
8 16 HG       248.   2.185  12.96   1365.    1.013    251.  2.212  1382.  0.089       22.  0.197    123.
9 C.T.       1590.   0.950  10.12    123.    1.177   1871.  1.118   145.  0.021       39.  0.023      3.
                                                  -----(CYCLE COMPOSITE)-------      314.  4.490   1044.
CYCLE 2
1 IDLE        471.   5.402   8.03     44.    1.290    608.  6.969    57.  0.036       22.  0.251      2.
2 16 HG       291.   2.446  13.11   1280.    0.990    288.  2.423  1268.  0.089       26.  0.216    113.
3 10 HG       238.   2.763  13.03   1797.    0.988    235.  2.731  1776.  0.257       60.  0.702    456.
4 16 HG       230.   2.152  13.14   1490.    1.002    230.  2.156  1493.  0.089       20.  0.192    133.
5 19 HG       210.   1.579  13.28    470.    1.014    213.  1.601   477.  0.047       10.  0.075     22.
6 16 HG       229.   1.989  13.23   1437.    1.002    229.  1.993  1440.  0.089       20.  0.177    128.
7  3 HG       278.   8.772   9.44    326.    1.026    285.  9.002   335.  0.283       81.  2.548     95.
8 16 HG       231.   2.039  13.07   1461.    1.011    234.  2.062  1477.  0.089       21.  0.184    131.
9 C.T.       1611.   0.701  10.06    127.    1.193   1923.  0.837   152.  0.021       40.  0.018      3.
                                                  -----(CYCLE COMPOSITE)-------      300.  4.363   1083.
CYCLE 3
1 IDLE        323.   5.254   8.13     54.    1.305    422.  6.857    70.  0.036       15.  0.247      3.
2 16 HG       256.   2.353  13.09   1275.    0.997    255.  2.345  1271.  0.089       23.  0.209    113.
3 10 HG       234.   2.725  13.05   1813.    0.989    231.  2.695  1793.  0.257       59.  0.693    461.
4 16 HG       226.   2.057  13.18   1428.    1.003    227.  2.064  1433.  0.089       20.  0.184    128.
5 19 HG       213.   1.701  13.17    527.    1.018    217.  1.731   536.  0.047       10.  0.081     25.
6 16 HG       226.   2.081  13.19   1427.    1.002    226.  2.085  1430.  0.089       20.  0.186    127.
7  3 HG       275.   8.704   9.45    353.    1.028    283.  8.951   363.  0.283       80.  2.533    103.
8 16 HG       235.   2.144  12.98   1435.    1.014    238.  2.174  1455.  0.089       21.  0.193    129.
9 C.T.       1585.   0.892  10.18    131.    1.175   1862.  1.048   154.  0.021       39.  0.022      3.
                                                  -----(CYCLE COMPOSITE)-------      287.  4.348   1092.
CYCLE 4
1 IDLE        323.   5.254   8.13     54.    1.305    422.  6.857    70.  0.036       15.  0.247      3.
2 16 HG       266.   2.391  13.06   1233.    0.997    265.  2.383  1229.  0.089       24.  0.212    109.
3 10 HG       236.   2.802  13.00   1785.    0.990    234.  2.773  1767.  0.257       60.  0.713    454.
4 16 HG       228.   2.126  13.14   1472.    1.003    229.  2.133  1477.  0.089       20.  0.190    131.
5 19 HG       216.   1.806  13.14    579.    1.016    219.  1.835   588.  0.047       10.  0.086     28.
6 16 HG       228.   2.030  13.19   1446.    1.003    229.  2.036  1450.  0.089       20.  0.181    129.
7  3 HG       277.   8.703   9.43    352.    1.030    285.  8.963   363.  0.283       81.  2.537    103.
8 16 HG       234.   2.157  12.95   1437.    1.015    238.  2.192  1459.  0.089       21.  0.195    130.
9 C.T.       1576.   0.893  10.22    141.    1.172   1847.  1.047   165.  0.021       39.  0.022      3.
                                                  -----(CYCLE COMPOSITE)-------      290.  4.383   1090.


          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   307.   4.426  1063.

          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   289.   4.366  1091.

          FOUR CYCLE COMPOSITE - REPORTED VALUE

           HC    0.35*( 307.) + 0.65*( 289.) =   295.     PPM

           CO    0.35*( 4.426) + 0.65*( 4.366) =     4.387 PERCENT

          NO(K)  0.35*( 1063.) + 0.65*( 1091.) =  1081.     PPM

          DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)

          NO HUMIDITY CORRECTION FACTOR (K) =   1.063

          CORRECTED NO - 1149 PPM
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BK-CVS TK G-7 BASSE 169 65 CHEVROLET GVW 19500 9/17/74 RUN 2 500 PM
ODOM. 46490 292 I6 4*BTDC0500 RPMDWELL 32* W/D 72/83 29.16 CORR.076*
PAGE 2
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FEDERAL       CONCENTRATION  AS  MEASURED  DILUTION   A D J U S T E D   WEIGHTING    W E I G H T E D
MODE            HC     CO    CO2    NO(K)    FACTOR    HC      CO   NO(K)  FACTOR     HC     CO    NO(K)
------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE         349.  5.119   7.89     48.    1.339     467.  6.854    64.  0.036      17.  0.247     2.
2 16 HG        267.  2.431  12.80   1265.    1.013     271.  2.463  1282.  0.089      24.  0.219   114.
3 10 HG        221.  2.550  13.09   1878.    0.992     219.  2.531  1864.  0.257      56.  0.650   479.
4 16 HG        214.  2.061  13.13   1436.    1.008     216.  2.077  1449.  0.089      19.  0.185   129.
5 19 HG        203.  2.044  12.96    488.    1.021     207.  2.087   498.  0.047      10.  0.098    23.
6 16 HG        216.  1.905  13.25   1474.    1.005     217.  1.914  1481.  0.089      19.  0.170   132.
7  3 HG        263.  8.612   9.49    377.    1.030     271.  8.869   388.  0.283      77.  2.510   110.
8 16 HG        225.  2.061  13.09   1443.    1.010     227.  2.081  1457.  0.089      20.  0.185   130.
9 C.T.        1581.  0.898   9.98    132.    1.194    1888.  1.073   158.  0.021      40.  0.023     3.
                                                   ------(CYCLE COMPOSITE)-------   282.  4.287  1122.
CYCLE 2
1 IDLE         349.  5.119   7.89     48.    1.339     467.  6.854    64.  0.036      17.  0.247     2.
2 16 HG        249.  2.516  13.06   1225.    0.994     247.  2.500  1217.  0.089      22.  0.223   108.
3 10 HG        220.  2.802  13.04   1735.    0.988     217.  2.768  1714.  0.257      56.  0.711   440.
4 16 HG        219.  2.206  13.11   1338.    1.003     220.  2.214  1343.  0.089      20.  0.197   120.
5 19 HG        203.  1.720  13.16    514.    1.018     207.  1.751   523.  0.047      10.  0.082    25.
6 16 HG        218.  2.119  13.18   1367.    1.001     218.  2.122  1369.  0.089      19.  0.189   122.
7  3 HG        266.  8.608   9.52    364.    1.028     273.  8.846   374.  0.283      77.  2.503   106.
8 16 HG        216.  2.141  13.04   1441.    1.011     218.  2.165  1457.  0.089      19.  0.193   130.
9 C.T.        1542.  0.874  10.17    138.    1.181    1821.  1.032   163.  0.021      38.  0.022     3.
                                                   ------(CYCLE COMPOSITE)-------   278.  4.367  1056.
CYCLE 3
1 IDLE         298.  5.065   8.41     61.    1.288     384.  6.522    79.  0.036      14.  0.235     3.
2 16 HG        258.  2.590  13.02   1172.    0.993     256.  2.572  1164.  0.089      23.  0.229   104.
3 10 HG        221.  2.805  13.03   1791.    0.988     218.  2.772  1770.  0.257      56.  0.712   455.
4 16 HG        216.  2.186  13.14   1455.    1.003     217.  2.192  1459.  0.089      19.  0.195   130.
5 19 HG        202.  1.663  13.23    489.    1.015     205.  1.689   497.  0.047      10.  0.079    23.
6 16 HG        218.  2.050  13.22   1456.    1.001     218.  2.051  1457.  0.089      19.  0.183   130.
7  3 HG        267.  8.663   9.50    360.    1.027     274.  8.896   370.  0.283      78.  2.518   105.
8 16 HG        226.  2.129  13.06   1437.    1.010     228.  2.150  1451.  0.089      20.  0.191   129.
9 C.T.        1554.  0.860  10.13    135.    1.185    1841.  1.019   160.  0.021      39.  0.021     3.
                                                   ------(CYCLE COMPOSITE)-------   278.  4.363  1082.
CYCLE 4
1 IDLE         298.  5.065   8.41     61.    1.288     384.  6.522    79.  0.036      14.  0.235     3.
2 16 HG        259.  2.656  12.99   1182.    0.993     257.  2.638  1174.  0.089      23.  0.235   104.
3 10 HG        228.  2.827  13.06   1739.    0.985     225.  2.785  1713.  0.257      58.  0.716   440.
4 16 HG        221.  2.134  13.16   1379.    1.002     221.  2.138  1382.  0.089      20.  0.190   123.
5 19 HG        206.  1.706  13.22    522.    1.015     209.  1.731   530.  0.047      10.  0.081    25.
6 16 HG        220.  2.041  13.25   1449.    0.999     220.  2.040  1448.  0.089      20.  0.182   129.
7  3 HG        270.  8.677   9.52    353.    1.025     277.  8.892   362.  0.283      78.  2.516   102.
8 16 HG        228.  2.150  13.02   1383.    1.010     230.  2.172  1397.  0.089      20.  0.193   124.
9 C.T.        1555.  0.925  10.25    137.    1.170    1820.  1.083   160.  0.021      38.  0.023     3.
                                                   ------(CYCLE COMPOSITE)-------   281.  4.371  1053.


            AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   280.   4.327  1089.

            AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   280.   4.367  1068.

            FOUR CYCLE COMPOSITE - REPORTED VALUE

             HC     0.35*(  280.) + 0.65*(  280.) =   280.    PPM

             CO     0.35*( 4.327) + 0.65*( 4.367) =      4.353 PERCENT

            NO(K)  0.35*( 1089.) + 0.65*( 1068.) =  1075.    PPM

            DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.4*HC)

            NO HUMIDITY CORRECTION FACTOR (K) =    1.083

            CORRECTED NO = 1164 PPM
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TRUCK G-8

1965 GMC 19500 LB GVW VAN
WITH 351 CID V6 ENGINE

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BK-CVS TK G-8 A&W TRANSFER 65 GMC GVW 19500 10/1/74 RUN 1 2:00PM
ODOM. 94552 351 V6 5*BTDC@550 RPM 32* DWELL W/D 62/76 29.48 CORR.
PAGE 2
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FEDERAL     CONCENTRATION  AS  MEASURED  DILUTION   A D J U S T E D    WEIGHTING    W E I G H T E D
MODE          HC      CO    CO2   NO(K)    FACTOR     HC       CO  NO(K)  FACTOR      HC      CO    NO(K)
------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE       617.  6.032   6.45     53.    1.430     882.  8.626    76.   0.036      32.   0.311     3.
2 16 HG      223.  3.019  12.96    782.    0.986     220.  2.976   771.   0.089      20.   0.265    69.
3 10 HG      194.  1.653  13.85   2202.    0.974     189.  1.610  2144.   0.257      49.   0.414   551.
4 16 HG      190.  3.342  13.02    823.    0.973     185.  3.252   801.   0.089      16.   0.289    71.
5 19 HG      224.  7.799   9.44    160.    1.068     239.  8.327   171.   0.047      11.   0.391     8.
6 16 HG      185.  2.737  13.35    880.    0.972     180.  2.660   855.   0.089      16.   0.237    76.
7  3 HG      208.  4.847  12.14   1026.    0.981     204.  4.755  1007.   0.283      58.   1.346   285.
8 16 HG      189.  3.666  12.78    757.    0.979     185.  3.589   741.   0.089      16.   0.319    66.
9 C.T.      5711.  2.568   2.51    153.    1.456    8314.  3.739   223.   0.021     175.   0.079     5.
                                                  ------(CYCLE COMPOSITE)--------   393.   3.651  1134.
CYCLE 2
1 IDLE       617.  6.032   6.45     53.    1.430     882.  8.626    76.   0.036      32.   0.311     3.
2 16 HG      233.  2.872  13.12    771.    0.979     228.  2.812   755.   0.089      20.   0.250    67.
3 10 HG      202.  1.587  13.82   2206.    0.978     198.  1.552  2157.   0.257      51.   0.399   554.
4 16 HG      189.  2.941  13.23    893.    0.973     184.  2.862   869.   0.089      16.   0.255    77.
5 19 HG      209.  5.684  10.77    278.    1.048     219.  5.955   291.   0.047      10.   0.280    14.
6 16 HG      187.  2.692  13.36    964.    0.973     182.  2.618   937.   0.089      16.   0.233    83.
7  3 HG      212.  4.660  12.29   1113.    0.976     207.  4.550  1087.   0.283      59.   1.288   308.
8 16 HG      174.  2.581  13.44   1009.    0.972     169.  2.508   981.   0.089      15.   0.223    87.
9 C.T.      4638.  2.496   2.48    170.    1.569    7278.  3.917   267.   0.021     153.   0.082     6.
                                                  ------(CYCLE COMPOSITE)--------   372.   3.321  1199.
CYCLE 3
1 IDLE       610.  5.186   6.32     88.    1.515     924.  7.858   133.   0.036      33.   0.283     5.
2 16 HG      237.  2.432  13.38    885.    0.976     231.  2.373   864.   0.089      21.   0.211    77.
3 10 HG      202.  1.366  13.88   2308.    0.981     198.  1.340  2264.   0.257      51.   0.344   582.
4 16 HG      216.  4.091  12.39    765.    0.988     213.  4.044   756.   0.089      19.   0.360    67.
5 19 HG      204.  4.994  11.26    316.    1.037     212.  5.180   328.   0.047      10.   0.243    15.
6 16 HG      188.  2.499  13.42    971.    0.975     183.  2.437   947.   0.089      16.   0.217    84.
7  3 HG      224.  4.635  12.32   1155.    0.974     218.  4.517  1126.   0.283      62.   1.278   319.
8 16 HG      207.  4.737  11.92    675.    0.999     207.  4.734   675.   0.089      18.   0.421    60.
9 C.T.      4327.  2.322   3.01    152.    1.640    7097.  3.809   249.   0.021     149.   0.080     5.
                                                  ------(CYCLE COMPOSITE)--------   379.   3.437  1214.
CYCLE 4
1 IDLE       610.  5.186   6.32     88.    1.515     924.  7.858   133.   0.036      33.   0.283     5.
2 16 HG      249.  2.867  13.27    815.    0.969     241.  2.777   789.   0.089      21.   0.247    70.
3 10 HG      212.  1.524  13.83   2312.    0.978     207.  1.491  2262.   0.257      53.   0.383   581.
4 16 HG      209.  3.432  12.93    846.    0.974     204.  3.344   824.   0.089      18.   0.298    73.
5 19 HG      211.  5.088  11.02    324.    1.051     222.  5.346   341.   0.047      10.   0.251    16.
6 16 HG      196.  2.712  13.33    964.    0.973     191.  2.639   938.   0.089      17.   0.235    83.
7  3 HG      227.  4.658  12.17   1139.    0.983     223.  4.579  1120.   0.283      63.   1.296   317.
8 16 HG      187.  2.793  13.34   1008.    0.971     181.  2.711   978.   0.089      16.   0.241    87.
9 C.T.      4342.  2.400   3.10    191.    1.613    7003.  3.871   308.   0.021     147.   0.081     6.
                                                  ------(CYCLE COMPOSITE)--------   378.   3.315  1238.


          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   383.   3.486  1167.

          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   379.   3.376  1226.

          FOUR CYCLE COMPOSITE - REPORTED VALUE

           HC     0.35*(  383.) + 0.65*(  379.) =   380.     PPM

           CO     0.35*( 3.486) + 0.65*( 3.376) =      3.414 PERCENT

          NO(K)   0.35*( 1167.) + 0.65*( 1226.) =  1205.     PPM

          DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

          NO-HUMIDITY CORRECTION FACTOR (K) =   0.946

          CORRECTED NO = 1140 PPM
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BK-CVS TK G-8 A0W TRANSFER 65 GMC GVW 19500 10/1/74 RUN 2 1330
ODOM. 94560 351 V6 5*BTDC@550 RPM 32* DWELL W/D 80/63 29.46 CORR.
PAGE 2
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FEDERAL      CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D   WEIGHTING     W E I G H T E D
MODE           HC     CO    CO2   NO(K)    FACTOR      HC      CO  NO(K)  FACTOR     HC     CO    NO(K)
------------------------------------------------------------------------------------------------
CYCLE 1
1  IDLE       485.  5.632   6.65     59.    1.451     704.  8.175    86.  0.036     25.  0.294      3.
2 16 MG       234.  4.522  11.51    539.    1.034     242.  4.677   557.  0.089     22.  0.416     50.
3 10 MG       189.  1.555  13.63   2222.    0.992     188.  1.543  2205.  0.257     48.  0.397    567.
4 16 MG       224.  5.436  11.09    487.    1.032     231.  5.610   503.  0.089     21.  0.499     45.
5 19 MG       213.  6.642  10.13    249.    1.060     226.  7.040   264.  0.047     11.  0.331     12.
6 16 MG       202.  3.599  12.44    840.    1.003     203.  3.609   842.  0.089     18.  0.321     75.
7  3 MG       220.  4.626  11.89   1141.    1.004     221.  4.645  1146.  0.283     63.  1.315    324.
8 16 MG       213.  5.638  10.95    526.    1.036     221.  5.839   545.  0.089     20.  0.520     49.
9 C.T.       4775.  2.457   2.57    157.    1.618    7727.  3.976   254.  0.021    162.  0.083      5.
                                                 ------(CYCLE COMPOSITE)-------  390.  4.176   1130.

CYCLE 2
1  IDLE       485.  5.632   6.65     59.    1.451     704.  8.175    86.  0.036     25.  0.294      3.
2 16 MG       246.  2.732  12.94    785.    0.995     245.  2.717   781.  0.089     22.  0.242     70.
3 10 MG       209.  1.495  13.62   2301.    0.993     208.  1.485  2285.  0.257     53.  0.382    587.
4 16 MG       213.  3.585  12.39    806.    1.006     214.  3.607   811.  0.089     19.  0.321     72.
5 19 MG       209.  5.169  10.88    314.    1.059     221.  5.475   333.  0.047     10.  0.257     16.
6 16 MG       197.  2.784  13.00    916.    0.993     196.  2.765   910.  0.089     17.  0.246     81.
7  3 MG       224.  4.586  11.88   1113.    1.006     225.  4.615  1117.  0.283     64.  1.306    316.
8 16 MG       197.  3.629  12.39    845.    1.006     198.  3.652   850.  0.089     18.  0.325     76.
9 C.T.       4278.  2.242   2.91    181.    1.676    7171.  3.758   303.  0.021    151.  0.079      6.
                                                 ------(CYCLE COMPOSITE)-------  379.  3.452   1227.

CYCLE 3
1  IDLE       627.  5.031   6.19    114.    1.544     968.  7.769   176.  0.036     35.  0.280      6.
2 16 MG       247.  2.709  12.92    886.    0.997     246.  2.702   884.  0.089     22.  0.240     79.
3 10 MG       213.  1.549  13.58   2274.    0.995     212.  1.541  2262.  0.257     54.  0.396    581.
4 16 MG       208.  2.965  12.86    960.    0.996     207.  2.953   956.  0.089     18.  0.263     85.
5 19 MG       208.  4.608  11.12    377.    1.063     221.  4.899   401.  0.047     10.  0.230     19.
6 16 MG       201.  2.759  12.98    970.    0.995     200.  2.744   965.  0.089     18.  0.244     86.
7  3 MG       239.  4.740  11.77   1112.    1.007     241.  4.773  1120.  0.283     68.  1.351    317.
8 16 MG       217.  4.556  11.58    667.    1.029     223.  4.689   686.  0.089     20.  0.417     61.
9 C.T.       4423.  2.293   2.82    178.    1.657    7330.  3.800   295.  0.021    154.  0.080      6.
                                                 ------(CYCLE COMPOSITE)-------  399.  3.501   1240.

CYCLE 4
1  IDLE       627.  5.031   6.19    114.    1.544     968.  7.769   176.  0.036     35.  0.280      6.
2 16 MG       251.  2.588  12.95    889.    0.999     251.  2.586   888.  0.089     22.  0.230     79.
3 10 MG       212.  1.521  13.54   2291.    0.998     212.  1.518  2286.  0.257     54.  0.390    588.
4 16 MG       205.  2.862  12.92   1002.    0.995     204.  2.848   997.  0.089     18.  0.253     89.
5 19 MG       206.  4.846  10.39    347.    1.064     219.  5.155   369.  0.047     10.  0.242     17.
6 16 MG       198.  2.746  12.77    955.    0.997     197.  2.737   952.  0.089     18.  0.244     85.
7  3 MG       227.  4.613  11.86   1174.    1.006     228.  4.639  1181.  0.283     65.  1.313    334.
8 16 MG       206.  3.958  12.09    816.    1.015     209.  4.016   828.  0.089     19.  0.357     74.
9 C.T.       5343.  2.374   2.39    207.    1.551    8286.  3.682   321.  0.021    174.  0.077      7.
                                                 ------(CYCLE COMPOSITE)-------  415.  3.386   1279.


        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   385.  3.814  1179.

        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   407.  3.444  1260.

        FOUR CYCLE COMPOSITE - REPORTED VALUE

         HC     0.35*(  385.) + 0.65*(  407.) =   400.    PPM

         CO     0.35*( 3.814) + 0.65*( 3.444) =      3.574 PERCENT

        NO(K)  0.35*( 1179.) + 0.65*( 1260.) =  1232.    PPM

        DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

        NO HUMIDITY CORRECTION FACTOR (K) =   0.937

        CORRECTED NO = 1154 PPM
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TRUCK G-9

1966 CHEVROLET 34000 LB GCW TRACTOR WITH 366 CID V8 ENGINE

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BK-CVS TK G-9 TRACTOR #1 66 CHEVROLET GVW 19500 10/8/74 RUN 1 1:30 PM
ODOM. 30471 366 CID V-8 6*BTDC @600 RPM 30* DWELL W/D 79/66 29.36 CORR.
PAGE 2
------------------------------------------------------------------------------------------------
FEDERAL      CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D   WEIGHTING     W E I G H T E D
MODE          HC     CO     CO2    NO(K)    FACTOR    HC       CO  NO(K)  FACTOR      HC     CO    NO(K)
------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        908.  1.799   8.57     39.    1.388    1260.  2.496    54.  0.036       45.  0.090     2.
2 16 HG       484.  2.848  12.56   1020.    1.000     484.  2.848  1020.  0.089       43.  0.253    91.
3 10 HG       244.  0.950  13.70   2574.    1.004     245.  0.954  2585.  0.257       63.  0.245   664.
4 16 HG       224.  1.908  13.41   1213.    0.993     222.  1.895  1205.  0.089       20.  0.169   107.
5 19 HG       165.  0.835  13.21    453.    1.050     173.  0.877   476.  0.047        8.  0.041    22.
6 16 HG       218.  1.861  13.42   1201.    0.994     217.  1.850  1194.  0.089       19.  0.165   106.
7  3 HG       275.  3.045  13.23   1988.    0.963     265.  2.934  1915.  0.283       75.  0.830   542.
8 16 HG       231.  2.409  13.27   1226.    0.985     228.  2.373  1208.  0.089       20.  0.211   108.
9 C.T.       2607.  2.335   6.11    140.    1.436    3743.  3.352   201.  0.021       79.  0.070     4.
                                                   -----(CYCLE COMPOSITE)-------   372.  2.074  1646.
CYCLE 2
1 IDLE        908.  1.799   8.57     39.    1.388    1260.  2.496    54.  0.036       45.  0.090     2.
2 16 HG       279.  1.903  13.39   1112.    0.990     276.  1.885  1101.  0.089       25.  0.168    98.
3 10 HG       238.  0.898  13.76   2666.    1.002     238.  0.900  2672.  0.257       61.  0.231   687.
4 16 HG       232.  1.988  13.42   1317.    0.969     229.  1.966  1303.  0.089       20   0.175   116.
5 19 HG       177.  0.758  13.22    422.    1.051     186.  0.797   444.  0.047        9.  0.037    21.
6 16 HG       241.  2.057  13.39   1237.    0.988     238.  2.032  1222.  0.089       21.  0.181   109.
7  3 HG       289.  3.115  13.22   2024.    0.961     278.  2.993  1945.  0.283       79.  0.847   550.
8 16 HG       237.  2.313  13.35   1209.    0.982     233.  2.271  1187.  0.089       21.  0.202   106.
9 C.T.       2578.  2.194   6.18    138.    1.441    3716.  3.162   199.  0.021       78.  0.066     4.
                                                   -----(CYCLE COMPOSITE)-------   359.  1.997  1693.
CYCLE 3
1 IDLE        949.  1.806   8.85     53.    1.346    1278.  2.431    71.  0.036       46.  0.088     3.
2 16 HG       558.  1.825  13.43   1217.    0.971     542.  1.771  1181.  0.089       48.  0.158   105.
3 10 HG       246.  0.853  13.75   2725.    1.003     247.  0.856  2734.  0.257       63.  0.220   703.
4 16 HG       247.  1.996  13.40   1330.    0.988     244.  1.973  1315.  0.089       22.  0.176   117.
5 19 HG       198.  0.686  13.18    401.    1.056     209.  0.724   423.  0.047       10.  0.034    20.
6 16 HG       236.  1.846  13.40   1309.    0.995     235.  1.837  1303.  0.089       21.  0.163   116.
7  3 HG       278.  3.063  13.23   2068.    0.963     268.  2.949  1991.  0.283       76.  0.835   563.
8 16 HG       248.  2.391  13.22   1228.    0.987     245.  2.360  1212.  0.089       22.  0.210   108.
9 C.T.       2510.  2.205   6.19    142.    1.450    3640.  3.197   206.  0.021       76.  0.067     4.
                                                  ------(CYCLE COMPOSITE)-------   384.  1.951  1739.
CYCLE 4
1 IDLE        949.  1.806   8.85     53.    1.346    1278.  2.431    71.  0.036       46.  0.088     3.
2 16 HG       354.  1.891  13.37   1162.    0.986     349.  1.865  1146.  0.089       31.  0.166   102.
3 10 HG       276.  0.860  13.80   2665.    0.998     275.  0.858  2659.  0.257       71.  0.221   683.
4 16 HG       279.  2.006  13.36   1302.    0.989     276.  1.984  1288.  0.089       25.  0.177   115.
5 19 HG       213.  0.804  13.28    426.    1.042     222.  0.838   444.  0.047       10.  0.039    21.
6 16 HG       281.  1.968  13.47   1302.    0.983     276.  1.935  1280.  0.089       25.  0.172   114.
7  3 HG       385.  3.060  13.23   2075.    0.955     368.  2.923  1982.  0.283      104.  0.827   561.
8 16 HG       302.  2.433  13.25   1262.    0.980     296.  2.384  1236.  0.089       26.  0.212   110.
9 C.T.       2555.  2.078   6.21    145.    1.449    3701.  3.010   210.  0.021       78.  0.063     4.
                                                  ------(CYCLE COMPOSITE)-------   416.  1.965  1713.


        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   366.  2.036  1670.

        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   400.  1.958  1726.

        FOUR CYCLE COMPOSITE - REPORTED VALUE

         HC     0.35*(  366.) + 0.65*(  400.) =   388.    PPM

         CO     0.35*( 2.036) + 0.65*( 1.958) =     1.986 PERCENT

        NO(K)   0.35*( 1670.) + 0.65*( 1726.) =  1707.    PPM

        DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.0*HC)

        NO HUMIDITY CORRECTION FACTOR (K) =   1.00

        CORRECTED NO = 1707 PPM
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BK-CVS TK G-9 CHEVROLET TRACTOR 66 GVW 19500 10/8/74 RUN 2 2:35 PM
ODOM. 30497 366 CID V-8 6* BTDC @600 RPM 30* DWELL W/D 74/62 29.35
PAGE 2
-----------------------------------------------  ------------------------------------------------------------
FEDERAL      CONCENTRATION  AS  MEASURED   DILUTION   A D J U S T E D   WEIGHTING    W E I G H T E D
MODE          HC      CO     CO2   NO(K)    FACTOR    HC      CO   NO(K)  FACTOR     HC     CO    NO(K)
-------------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        286.  2.311   9.40    45.     1.334    382.  3.083    60.  0.036     14.  0.111     2.
2 16 HG       217.  1.502  13.18  1185.     1.024    222.  1.538  1213.  0.089     20.  0.137   108.
3 10 HG       184.  0.810  13.56  2678.     1.023    188.  0.829  2740.  0.257     48.  0.213   704.
4 16 HG       204.  1.917  13.21  1257.     1.008    206.  1.932  1267.  0.089     18.  0.172   113.
5 19 HG       137.  0.896  13.04   429.     1.063    146.  0.952   456.  0.047      7.  0.045    21.
6 16 HG       193.  1.665  13.34  1280.     1.008    195.  1.679  1291.  0.089     17.  0.149   115.
7  3 HG       337.  2.855  13.14  2095.     0.971    327.  2.773  2035.  0.283     93.  0.785   576.
8 16 HG       256.  2.314  13.07  1137.     0.999    256.  2.312  1136.  0.089     23.  0.206   101.
9 C.T.       2656.  2.376   6.01   131.     1.440   3824.  3.421   189.  0.021     80.  0.072     4.
                                                  ------(CYCLE COMPOSITE)-------  320.  1.890  1744.
CYCLE 2
1 IDLE        286.  2.311   9.40    45.     1.334    382.  3.083    60.  0.036     14.  0.111     2.
2 16 HG       256.  1.688  13.34  1225.     1.003    257.  1.693  1228.  0.089     23.  0.151   109.
3 10 HG       209.  0.892  13.58  2683.     1.017    213.  0.907  2728.  0.257     55.  0.233   701.
4 16 HG       209.  1.863  13.27  1281.     1.005    210.  1.872  1287.  0.089     19.  0.167   115.
5 19 HG       152.  0.657  13.12   403.     1.065    162.  0.700   429.  0.047      8.  0.033    20.
6 16 HG       201.  1.611  13.41  1251.     1.004    202.  1.618  1256.  0.089     18.  0.144   112.
7  3 HG       317.  2.821  13.17  2183.     0.972    308.  2.742  2122.  0.283     87.  0.776   601.
8 16 HG       215.  2.228  13.21  1149.     0.997    214.  2.220  1145.  0.089     19.  0.198   102.
9 C.T.       2670.  2.333   6.02   139.     1.440   3845.  3.359   200.  0.021     81.  0.071     4.
                                                  ------(CYCLE COMPOSITE)-------  324.  1.884  1766.
CYCLE 3
1 IDLE       1379.  1.892   8.19    56.     1.364   1881.  2.581    76.  0.036     68.  0.093     3.
2 16 HG       537.  1.671  13.31  1207.     0.984    529.  1.645  1188.  0.089     47.  0.146   106.
3 10 HG       219.  0.804  13.64  2688.     1.015    222.  0.816  2729.  0.257     57.  0.210   701.
4 16 HG       224.  1.944  13.24  1298.     1.003    225.  1.951  1302.  0.089     20.  0.174   116.
5 19 HG       157.  0.728  13.13   408.     1.061    167.  0.773   433.  0.047      8.  0.036    20.
6 16 HG       216.  1.734  13.38  1302.     1.001    216.  1.736  1304.  0.089     19.  0.155   116.
7  3 HG       330.  2.892  13.14  2127.     0.970    320.  2.805  2063.  0.283     91.  0.794   584.
8 16 HG       216.  2.138  13.19  1163.     1.001    216.  2.139  1164.  0.089     19.  0.190   104.
9 C.T.       2643.  2.111   6.12   143.     1.446   3821.  3.052   207.  0.021     80.  0.064     4.
                                                  ------(CYCLE COMPOSITE)-------  409.  1.862  1754.
CYCLE 4
1 IDLE       1379.  1.892   8.19    56.     1.364   1881.  2.581    76.  0.036     68.  0.093     3.
2 16 HG       561.  1.694  13.26  1159.     0.985    553.  1.669  1142.  0.089     49.  0.149   102.
3 10 HG       250.  0.836  13.61  2784.     1.014    253.  0.848  2823.  0.257     65.  0.218   726.
4 16 HG       226.  1.859  13.22  1265.     1.008    228.  1.873  1275.  0.089     20.  0.167   113.
5 19 HG       167.  0.794  12.93   379.     1.073    179.  0.852   407.  0.047      8.  0.040    19.
6 16 HG       219.  1.670  13.30  1311.     1.008    221.  1.684  1322.  0.089     20.  0.153   118.
7  3 HG       281.  2.763  13.20  2120.     0.974    274.  2.692  2066.  0.283     78.  0.762   585.
8 16 HG       234.  2.371  13.04  1235.     1.001    234.  2.374  1237.  0.089     21.  0.211   110.
9 C.T.       2618.  2.165   6.12   140.     1.446   3785.  3.130   202.  0.021     79.  0.066     4.
                                                  ------(CYCLE COMPOSITE)-------  408.  1.856  1780.


          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   322.  1.887  1755.

          AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   409.  1.859  1767.

          FOUR CYCLE COMPOSITE - REPORTED VALUE

           HC     0.35*(  322.) + 0.65*(  409.) =    379.     PPM

           CO     0.35*( 1.887) + 0.65*( 1.859) =      1.868 PERCENT

          NO(K)   0.35*( 1755.) + 0.65*( 1767.) =  1763.     PPM

          DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)

          NO HUMIDITY CORRECTION FACTOR (K) =  0.958

          CORRECTED NO = 1689 PPM
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TRUCK G-10

1969 FORD 43500 LB GCW TRACTOR
WITH 391 CID V8 ENGINE

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BK-CVS TK G-10 R C CULA 114 69 FORD GVW 24.000 10/15/74 RUN 1 2:00 PM
ODOM. 71581 391 V-8 8*BTDC 0600 RPM 27* W/D 71/56 29.46 CORR.
PAGE 2
----------------------------------------------------------------------------------------------------------
FEDERAL     CONCENTRATION  AS  MEASURED  DILUTION    A D J U S T E D    WEIGHTING     W E I G H T E D
MODE          HC     CO    CO2   NO(K)     FACTOR     HC      CO   NO(K)  FACTOR      HC     CO    NO(K)
----------------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE        606.  4.168   9.69    71.    1.167     707.  4.866    83.  0.036      25.  0.175     3.
2 16 HG       255.  4.355  11.58   385.    1.033     263.  4.498   398.  0.089      23.  0.400    35.
3 10 HG       212.  3.172  12.97  1442.    0.980     208.  3.110  1414.  0.257      53.  0.799   363.
4 16 HG       202.  4.143  12.08   412.    1.009     204.  4.100   416.  0.089      18.  0.372    37.
5 19 HG       191.  5.419  10.98   153.    1.043     199.  5.653   160.  0.047       9.  0.266     8.
6 16 HG       185.  4.264  12.17   393.    1.000     185.  4.264   393.  0.089      16.  0.379    35.
7  3 HG       231.  6.580  10.90   725.    1.004     232.  6.607   728.  0.283      66.  1.870   206.
8 16 HG       179.  4.467  12.12   424.    0.997     179.  4.455   423.  0.089      16.  0.396    38.
9 C.T.       2326.  2.149   8.44   109.    1.206    2806.  2.592   131.  0.021      59.  0.054     3.
                                                  ------(CYCLE COMPOSITE)-------    285.  4.711   728.
CYCLE 2
1 IDLE        606.  4.168   9.69    71.    1.167     707.  4.866    83.  0.036      25.  0.175     3.
2 16 HG       221.  4.200  12.21   387.    0.997     220.  4.186   386.  0.089      20.  0.373    34.
3 10 HG       187.  3.203  13.15  1385.    0.970     181.  3.107  1343.  0.257      47.  0.798   345.
4 16 HG       180.  4.225  12.29   394.    0.994     179.  4.199   392.  0.089      16.  0.374    35.
5 19 HG       178.  5.431  11.15   171.    1.031     184.  5.601   176.  0.047       9.  0.263     8.
6 16 HG       176.  4.211  12.31   397.    0.992     175.  4.179   394.  0.089      16.  0.372    35.
7  3 HG       228.  6.835  10.79   695.    1.003     229.  6.854   697.  0.283      65.  1.940   197.
8 16 HG       176.  4.369  12.23   427.    0.993     175.  4.339   424.  0.089      16.  0.386    38.
9 C.T.       2382.  1.826   8.55   127.    1.205    2871.  2.201   153.  0.021      60.  0.046     3.
                                                  ------(CYCLE COMPOSITE)-------    274.  4.727   698.
CYCLE 3
1 IDLE        686.  3.378   9.77   122.    1.189     815.  4.015   145.  0.036      29.  0.145     5.
2 16 HG       166.  4.159  12.31   429.    0.995     165.  4.139   427.  0.089      15.  0.368    38.
3 10 HG       170.  3.198  13.13  1469.    0.973     165.  3.110  1429.  0.257      42.  0.799   367.
4 16 HG       165.  4.170  12.36   453.    0.991     164.  4.133   449.  0.089      15.  0.368    40.
5 19 HG       162.  5.463  11.11   196.    1.035     168.  5.654   203.  0.047       8.  0.266    10.
6 16 HG       161.  4.123  12.37   426.    0.993     160.  4.095   423.  0.089      14.  0.364    38.
7  3 HG       220.  6.603  10.91   785.    1.003     221.  6.626   788.  0.283      63.  1.875   223.
8 16 HG       167.  4.387  12.29   457.    0.989     165.  4.339   452.  0.089      15.  0.386    40.
9 C.T.       2481.  1.974   8.26   147.    1.215    3015.  2.399   179.  0.021      63.  0.058     4.
                                                  -----(CYCLE COMPOSITE)-------     264.  4.621   755.
CYCLE 4
1 IDLE        686.  3.378   9.77   122.    1.189     815.  4.015   145.  0.036      29.  0.145     5.
2 16 HG       194.  4.139  12.29   436.    0.995     193.  4.119   434.  0.089      17.  0.367    39.
3 10 HG       173.  3.207  13.14  1448.    0.971     168.  3.115  1406.  0.257      43.  0.801   361.
4 16 HG       167.  4.202  12.34   458.    0.992     166.  4.168   454.  0.089      15.  0.371    40.
5 19 HG       166.  5.455  11.13   205.    1.033     171.  5.634   212.  0.047       8.  0.265    10.
6 16 HG       168.  4.270  12.17   416.    1.001     168.  4.273   416.  0.089      15.  0.380    37.
7  3 HG       230.  6.647  10.85   780.    1.006     231.  6.684   784.  0.283      65.  1.892   222.
8 16 HG       171.  4.400  12.18   482.    0.996     170.  4.382   480.  0.089      15.  0.390    43.
9 C.T.       2413.  1.895   8.29   158.    1.224    2953.  2.319   193.  0.021      62.  0.049     4.
                                                  -----(CYCLE COMPOSITE)-------     269.  4.66[illegible]   761.


AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   280.   4.719    713.

AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   267.   4.641    763.

FOUR CYCLE COMPOSITE - REPORTED VALUE

 HC     0.35*(  280.) + 0.65*(  267.) =   272.     PPM

 CO     0.35*( 4.719) + 0.65*( 4.641) =      4.669 PERCENT

NO(K)   0.35*(  713.) + 0.65*(  763.) =   746.     PPM

DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)

NO HUMIDITY CORRECTION FACTOR (K) =   0.865
```

CORRECTED NO = 645 PPM

```
BK-CVS TK G10 RC COLA 114 69 FORD GVW 24000 10/15/74 RUN 2  :30 PM
ODOM. 71592 391 CID V-8 8* BTDC 0600 RPM 27* DSELL W/D 57/73 29.46 CORR.
PAGE 2
------------------------------------------------------------------------------------------------
FEDERAL     CONCENTRATION  AS  MEASURED  DILUTION   A D J U S T E D   WEIGHTING    W E I G H T E D
MODE          HC     CO    CO2   NO(K)    FACTOR   HC      CO  NO(K)   FACTOR      HC     CO    NO(K)
------------------------------------------------------------------------------------------------
CYCLE 1
1 IDLE       922.  2.963   9.29     51.    1.232   1136.  3.650    63.  0.036      41.  0.131     2.
2 16 HG      273.  4.046  11.81    369.    1.027    280.  4.155   379.  0.089      25.  0.370    34.
3 10 HG      204.  3.127  13.04   1350.    0.978    200.  3.059  1321.  0.257      51.  0.786   339.
4 16 HG      193.  4.149  12.14    396.    1.006    194.  4.172   398.  0.089      17.  0.371    35.
5 19 HG      184.  5.309  11.01    131.    1.046    192.  5.554   137.  0.047       9.  0.261     6.
6 16 HG      181.  4.105  12.18    363.    1.005    182.  4.125   365.  0.089      16.  0.367    32.
7  3 HG      235.  6.483  10.88    705.    1.009    237.  6.542   711.  0.283      67.  1.851   201.
8 16 HG      182.  4.340  12.11    387.    1.001    182.  4.346   388.  0.089      16.  0.387    35.
9 C.T.      2478.  2.258   8.12     87.    1.215   3012.  2.744   106.  0.021      63.  0.058     2.
                                                   ------(CYCLE COMPOSITE)-------  305.  4.582   686.
CYCLE 2
1 IDLE       922.  2.963   9.29     51.    1.232   1136.  3.650    63.  0.036      41.  0.131     2.
2 16 HG      238.  4.148  12.22    381.    0.997    237.  4.134   380.  0.089      21.  0.368    34.
3 10 HG      201.  3.251  13.10   1350.    0.970    195.  3.153  1309.  0.257      50.  0.810   336.
4 16 HG      190.  4.219  12.30    392.    0.992    188.  4.184   389.  0.089      17.  0.372    35.
5 19 HG      187.  5.481  11.03    135.    1.038    194.  5.689   140.  0.047       9.  0.267     7.
6 16 HG      186.  4.165  12.26    355.    0.997    185.  4.154   354.  0.089      16.  0.370    32.
7  3 HG      238.  6.491  10.91    723.    1.006    239.  6.527   727.  0.283      68.  1.847   206.
8 16 HG      184.  4.378  12.17    385.    0.996    183.  4.360   383.  0.089      16.  0.368    34.
9 C.T.      2140.  1.625   8.79     88.    1.217   2605.  1.978   107.  0.021      55.  0.042     2.
                                                   ------(CYCLE COMPOSITE)-------  293.  4.595   688.
CYCLE 3
1 IDLE       733.  3.354   9.69     95.    1.192    874.  3.999   113.  0.036      31.  0.144     4.
2 16 HG      244.  4.178  12.20    390.    0.997    243.  4.164   389.  0.089      22.  0.371    35.
3 10 HG      208.  3.321  13.09   1416.    0.969    201.  3.217  1372.  0.257      52.  0.827   353.
4 16 HG      197.  4.206  12.31    431.    0.992    195.  4.171   427.  0.089      17.  0.371    38.
5 19 HG      192.  5.414  11.07    157.    1.036    199.  5.611   163.  0.047       9.  0.264     8.
6 16 HG      195.  4.222  12.22    415.    0.997    194.  4.210   414.  0.089      17.  0.375    37.
7  3 HG      243.  6.658  10.84    718.    1.005    244.  6.690   721.  0.283      69.  1.893   204.
8 16 HG      190.  4.436  12.10    403.    0.998    190.  4.427   402.  0.089      17.  0.394    36.
9 C.T.      2367.  2.101   8.32    112.    1.215   2877.  2.554   136.  0.021      60.  0.054     3.
                                                   ------(CYCLE COMPOSITE)-------  294.  4.693   718.
CYCLE 4
1 IDLE       733.  3.354   9.69     95.    1.192    874.  3.999   113.  0.036      31.  0.144     4.
2 16 HG      238.  4.213  12.12    416.    1.001    238.  4.216   416.  0.089      21.  0.375    37.
3 10 HG      206.  3.272  13.12   1378.    0.968    199.  3.167  1334.  0.257      51.  0.814   343.
4 16 HG      199.  4.250  12.21    461.    0.997    198.  4.235   459.  0.089      18.  0.377    41.
5 19 HG      193.  5.429  11.07    171.    1.036    200.  5.627   177.  0.047       9.  0.264     8.
6 16 HG      194.  4.287  12.17    423.    0.999    194.  4.281   422.  0.089      17.  0.381    38.
7  3 HG      239.  6.667  10.84    735.    1.005    240.  6.699   739.  0.283      68.  1.896   209.
8 16 HG      188.  4.467  12.12    441.    0.997    187.  4.452   439.  0.089      17.  0.396    39.
9 C.T.      2254.  1.850   8.58    127.    1.214   2737.  2.247   154.  0.021      57.  0.047     3.
                                                   ------(CYCLE COMPOSITE)-------  289.  4.694   722.


        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 1&2)   299.   4.589   687.

        AVERAGE SUM-(COMPOSITE VALUES FOR CYCLES 3&4)   292.   4.694   720.

        FOUR CYCLE COMPOSITE - REPORTED VALUE

         HC     0.35*(  299.) + 0.65*(  292.) =   295.    PPM

         CO     0.35*( 4.589) + 0.65*( 4.694) =      4.657 PERCENT

        NO(K)   0.35*(  687.) + 0.65*(  720.) =   708.    PPM

        DILUTION FACTOR = 14.5/(CO2+0.5*CO+10.8*HC)

        NO HUMIDITY CORRECTION FACTOR (K) =   0.870

        CORRECTED NO = 616 PPM
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APPENDIX H

CVS MASS EMISSION RESULTS FROM INDIVIDUAL TESTS OF THE NINE-MODE FTP FOR TEN PRECONTROLLED GASOLINE-POWERED TRUCKS

TRUCK G-1. 1967 FORD 17000 LB GVW VAN WITH 330 CID V8 ENGINE

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                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER  G1

DATE  7/18/74             TIME 11000 HRS.          TEST NO.  1
MODEL  1967  FORD                                  ENGINE 330 CID V8
DRIVER   JC               TEST WT.    *0 LB.       GVW17000 LB.

WET BULB TEMP  63 F       DRY BULB TEMP  70 F      R.H., HUM,  68,1 PCT
SPEC, HUM,  75,9 GRAIN/LB BARO,  29,36 IN, HG,     MEASURED FUEL  6,64 LB.


  RUN DURATION          20,01 MINUTES
  BLOWER INLET PRESS,   7,5  IN, H2O
  BLOWER DIF,  PRESS,  12,5  IN, H2O
  BLOWER INLET TEMP,    110  DEG, F
  BLOWER REVOLUTIONS  23380
  BLOWER CU, FT,/REV,  ,648

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE           60,2/3
   HC  SAMPLE  PPM                            602
   HC  BACKGRD METER READING/SCALE            1,6/3
   HC  BACKGRD PPM                             16
   CO  SAMPLE  METER READING/SCALE           92,8/2
   CO  SAMPLE  PPM                           3996
   CO  BACKGRD METER READING/SCALE            2,3/2
   CO  BACKGRD PPM                             65
   CO2 SAMPLE  METER READING/SCALE           35,8/2
   CO2 SAMPLE  PERCENT                        ,97
   CO2 BACKGRD METER READING/SCALE            2,3/2
   CO2 BACKGRD PERCENT                        ,06
   NOX SAMPLE  METER READING/SCALE           21,5/3
   NOX SAMPLE  PPM                           64,5
   NOX BACKGRD METER READING/SCALE             ,4/3
   NOX BACKGRD PPM                            1,2

   HC  CONCENTRATION PPM                      588
   CO  CONCENTRATION PPM                     3776
   CO2 CONCENTRATION PCT                      ,92
   NOX CONCENTRATION PPM                     63,4
   HC  MASS (GRAMS)                        129,73
   CO  MASS (GRAMS)                       1692,90
   CO2 MASS (GRAMS)                       6483,25
   NOX MASS (GRAMS)                         46,44

HC  GRAMS/MILE  *9,73
CO  GRAMS/MILE  *92,9
CO2 GRAMS/MILE   6483
NOX GRAMS/MILE  46,44

HC  GRAMS/LB OF FUEL  19,54     HC  GRAMS/MIN   6,48
CO  GRAMS/LB OF FUEL  253,4     CO  GRAMS/MIN   84,1
CO2 GRAMS/LB OF FUEL    976     CO2 GRAMS/MIN    324
NOX GRAMS/LB OF FUEL   6,99     NOX GRAMS/MIN   2,32


TOTAL CARBON = 2603,40 GRAMS
CARBON BALANCE FUEL WEIGHT =  6,63 LB.
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                  EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G1

DATE  7/18/74                 TIME  1330 HRS.         TEST NO.  2
MODEL  1967  FORD              VAN                    ENGINE 330 CID V8
DRIVER  TLC                   TEST WT.     -0 LB.     GVW17000 LB.

WET BULB TEMP  66 F           DRY BULB TEMP  74 F     REL. HUM.  65.7 PCT
SPEC. HUM.  84.1 GRAIN/LB     BARO.  29.34 IN. HG.    MEASURED FUEL  6.51 LB.


  RUN DURATION           20.00 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    12.5  IN. H2O
  BLOWER INLET TEMP.      110  DEG. F
  BLOWER REVOLUTIONS    23100
  BLOWER CU. FT./REV.    .648

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              60.2/3
   HC   SAMPLE  PPM                                602
   HC   BACKGRD METER READING/SCALE               1.6/3
   HC   BACKGRD PPM                                 16
   CO   SAMPLE  METER READING/SCALE              92.8/2
   CO   SAMPLE  PPM                               3996
   CO   BACKGRD METER READING/SCALE               2.3/2
   CO   BACKGRD PPM                                 65
   CO2  SAMPLE  METER READING/SCALE              35.8/2
   CO2  SAMPLE  PERCENT                            .97
   CO2  BACKGRD METER READING/SCALE               2.3/2
   CO2  BACKGRD PERCENT                            .06
   NOX  SAMPLE  METER READING/SCALE              21.5/3
   NOX  SAMPLE  PPM                               64.5
   NOX  BACKGRD METER READING/SCALE                .4/3
   NOX  BACKGRD PPM                                1.2

   HC   CONCENTRATION PPM                          588
   CO   CONCENTRATION PPM                         3779
   CO2  CONCENTRATION PCT                          .92
   NOX  CONCENTRATION PPM                         63.4
   HC   MASS (GRAMS)                            127.97
   CO   MASS (GRAMS)                           1661.37
   CO2  MASS (GRAMS)                           6395.24
   NOX  MASS (GRAMS)                             45.81

HC   GRAMS/MILE  *7.97
CO   GRAMS/MILE  *61.4
CO2  GRAMS/MILE   6395
NOX  GRAMS/MILE  45.81

HC   GRAMS/LB OF FUEL  19.66      HC   GRAMS/MIN   6.40
CO   GRAMS/LB OF FUEL  255.2      CO   GRAMS/MIN   83.1
CO2  GRAMS/LB OF FUEL    982      CO2  GRAMS/MIN    320
NOX  GRAMS/LB OF FUEL   7.04      NOX  GRAMS/MIN   2.29


TOTAL CARBON = 2568.63 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.54 LB.
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1968 IHC 18200 LB GVW VAN
WITH 304 CID V8 ENGINE

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                          EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                     TRUCK NUMBER G-2

DATE  7/31/74               TIME  1400 HRS.           TEST NO. 1
MODEL  1968 INTERNATIONAL   BOX VAN                   ENGINE 304 CID V8
DRIVER  ARL                 TEST WT. 11570 LB.        GVW18200 LB.

WET BULB TEMP  62 F         DRY BULB TEMP  73 F       REL. HUM.  53.8 PCT
SPEC. HUM.  66.5 GRAIN/LB   BARO.  29.20 IN. HG.      MEASURED FUEL  6.06 LB.

  RUN DURATION          20.00 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H20
  BLOWER DIF.  PRESS.   13.0  IN. H20
  BLOWER INLET TEMP.     100  DEG. F
  BLOWER REVOLUTIONS  23157
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                74.1/3
   HC   SAMPLE  PPM                                741
   HC   BACKGRD METER READING/SCALE                16.9/2
   HC   BACKGRD PPM                                 17
   CO   SAMPLE  METER READING/SCALE                59.9/2
   CO   SAMPLE  PPM                                2172
   CO   BACKGRD METER READING/SCALE                 1.5/2
   CO   BACKGRD PPM                                 51
   CO2  SAMPLE  METER READING/SCALE                57.0/3
   CO2  SAMPLE  PERCENT                             .94
   CO2  BACKGRD METER READING/SCALE                 5.2/3
   CO2  BACKGRD PERCENT                             .08
   NOX  SAMPLE  METER READING/SCALE                76.8/2
   NOX  SAMPLE  PPM                                76.8
   NOX  BACKGRD METER READING/SCALE                 1.0/2
   NOX  BACKGRD PPM                                 1.0

   HC   CONCENTRATION PPM                          726
   CO   CONCENTRATION PPM                          2049
   CO2  CONCENTRATION PCT                           .87
   NOX  CONCENTRATION PPM                          75.9
   HC   MASS (GRAMS)                              160.05
   CO   MASS (GRAMS)                              912.52
   CO2  MASS (GRAMS)                             6109.86
   NOX  MASS (GRAMS)                               55.57

HC   GRAMS/MILE   40.05
CO   GRAMS/MILE   912.5
CO2  GRAMS/MILE    6110
NOX  GRAMS/MILE   55.52

HC   GRAMS/LB OF FUEL  26.41      HC   GRAMS/MIN    8.00
CO   GRAMS/LB OF FUEL  150.6      CO   GRAMS/MIN    45.6
CO2  GRAMS/LB OF FUEL   1008      CO2  GRAMS/MIN     306
NOX  GRAMS/LB OF FUEL   9.16      NOX  GRAMS/MIN    2.78


TOTAL CARBON = 2197.40 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.94 LB.
```

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                     EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER G-2

DATE  7/21/74                   TIME 15000 HRS.          TEST NO.  2
MODEL  1968 INTERNATIONAL       BOX VAN                  ENGINE 304 CID V8
DRIVER  ARL                     TEST WT. 11570 LB.       GVW18200 LB.

WET BULB TEMP  62 F             DRY BULB TEMP  73 F      REL. HUM.  53.8 PCT
SPEC. HUM.  66.5 GRAIN/LB       BARO.  29.20 IN. HG.     MEASURED FUEL  5.60 LB.

  RUN DURATION            20.00 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       100  DEG. F
  BLOWER REVOLUTIONS  23164
  BLOWER CU. FT./REV.  .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                         60.1/3
   HC   SAMPLE  PPM                                          601
   HC   BACKGRD METER READING/SCALE                         26.0/2
   HC   BACKGRD PPM                                           26
   CO   SAMPLE  METER READING/SCALE                         62.3/2
   CO   SAMPLE  PPM                                         2285
   CO   BACKGRD METER READING/SCALE                          1.0/2
   CO   BACKGRD PPM                                           28
   CO2 SAMPLE  METER READING/SCALE                          56.4/3
   CO2 SAMPLE  PERCENT                                       .93
   CO2 BACKGRD METER READING/SCALE                           4.5/3
   CO2 BACKGRD PERCENT                                       .07
   NOX SAMPLE  METER READING/SCALE                          78.2/2
   NOX SAMPLE  PPM                                          78.2
   NOX BACKGRD METER READING/SCALE                           1.4/2
   NOX BACKGRD PPM
                                                             1.4
  HC   CONCENTRATION PPM
  CO   CONCENTRATION PPM                                     577
  CO2 CONCENTRATION PCT                                     2179
  NOX CONCENTRATION PPM                                      .87
  HC   MASS (GRAMS)                                         76.9
  CO   MASS (GRAMS)                                       127.38
  CO2 MASS (GRAMS)                                        970.77
  NOX MASS (GRAMS)                                       6097.16
                                                          56.29
HC   GRAMS/MILE  27.38
CO   GRAMS/MILE  970.8
CO2 GRAMS/MILE   6097
NOX GRAMS/MILE  56.29

HC   GRAMS/LB OF FUEL  22.75      HC   GRAMS/MIN   6.37
CO   GRAMS/LB OF FUEL  173.4      CO   GRAMS/MIN   48.5
CO2 GRAMS/LB OF FUEL   1089      CO2 GRAMS/MIN    305
NOX GRAMS/LB OF FUEL  10.05      NOX GRAMS/MIN   2.81


TOTAL CARBON = 2190.63 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.58 LB.
```

TRUCK G-3

1967 FORD 10000 LB GVW VAN
WITH 300 CID I6 ENGINE

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G3

DATE  8/ 9/79                 TIME  1045 HRS.          TEST NO.  1
MODEL  1967 FORD              BOX VAN                  ENGINE 300 CID I6
DRIVER  JGC                   TEST WT.  9190 LB.       GVW10000 LB.

WET BULB TEMP  65 F           DRY BULB TEMP  77 F      REL. HUM.  65.3 PCT
SPEC. HUM.  81.3 GRAIN/LB     BARO.  29.16 IN. HG.     MEASURED FUEL  5.96 LB.

  RUN DURATION            20.12 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       133  DEG. F
  BLOWER REVOLUTIONS     23326
  BLOWER CU. FT./REV.     .641

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                     34.1/3
   HC   SAMPLE  PPM                                      391
   HC   BACKGRD METER READING/SCALE                     15.2/2
   HC   BACKGRD PPM                                       15
   CO   SAMPLE  METER READING/SCALE                     78.5/2
   CO   SAMPLE  PPM                                     3125
   CO   BACKGRD METER READING/SCALE                      2.4/3
   CO   BACKGRD PPM                                       36
   CO2  SAMPLE  METER READING/SCALE                     51.4/3
   CO2  SAMPLE  PERCENT                                  .84
   CO2  BACKGRD METER READING/SCALE                      3.4/3
   CO2  BACKGRD PERCENT                                  .06
   NOX  SAMPLE  METER READING/SCALE                     78.5/2
   NOX  SAMPLE  PPM                                     78.5
   NOX  BACKGRD METER READING/SCALE                      1.3/2
   NOX  BACKGRD PPM                                      1.3

   HC   CONCENTRATION PPM                                377
   CO   CONCENTRATION PPM                               2977
   CO2  CONCENTRATION PCT                                .79
   NOX  CONCENTRATION PPM                               77.3
   HC   MASS (GRAMS)                                   78.39
   CO   MASS (GRAMS)                                 1249.26
   CO2  MASS (GRAMS)                                 5241.32
   NOX  MASS (GRAMS)                                   53.30

HC   GRAMS/MILE  78.39
CO   GRAMS/MILE  *49.3
CO2  GRAMS/MILE   5241
NOX  GRAMS/MILE  53.30

HC   GRAMS/LB OF FUEL  13.15      HC   GRAMS/MIN   3.90
CO   GRAMS/LB OF FUEL  209.6      CO   GRAMS/MIN   62.1
CO2  GRAMS/LB OF FUEL    879      CO2  GRAMS/MIN    261
NOX  GRAMS/LB OF FUEL   8.94      NOX  GRAMS/MIN   2.65


TOTAL CARBON = 2034.04 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.18 LB.
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              EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                        TRUCK NUMBER  63

DATE  8/ 9/74               TIME  1200 HRS.         TEST NO.  2
MODEL  1967 FORD            BOX VAN                 ENGINE 300 CID I6
DRIVER  JGC                 TEST WT.  9140 LB.      GVW10000 LB.

WET BULB TEMP  70 F         DRY BULB TEMP  75 F     REL. HUM.  78.2 PCT
SPEC. HUM.  *4.6 GRAIN/LB   BARO.  29.16 IN. HG.    MEASURED FUEL  5.80 LB.

  RUN DURATION           20.05 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      109  DEG. F
  BLOWER REVOLUTIONS    23198
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    37.2/3
   HC   SAMPLE  PPM                                     372
   HC   BACKGRD METER READING/SCALE                    18.0/2
   HC   BACKGRD PPM                                      18
   CO   SAMPLE  METER READING/SCALE                    76.2/2
   CO   SAMPLE  PPM                                    2997
   CO   BACKGRD METER READING/SCALE                     3.2/3
   CO   BACKGRD PPM                                      98
   CO2  SAMPLE  METER READING/SCALE                    54.6/3
   CO2  SAMPLE  PERCENT                                 .89
   CO2  BACKGRD METER READING/SCALE                     4.4/3
   CO2  BACKGRD PERCENT                                 .06
   NOX  SAMPLE  METER READING/SCALE                    81.8/2
   NOX  SAMPLE  PPM                                    81.8
   NOX  BACKGRD METER READING/SCALE                      .7/2
   NOX  BACKGRD PPM                                      .7

  HC   CONCENTRATION PPM                               356
  CO   CONCENTRATION PPM                              2828
  CO2  CONCENTRATION PCT                               .83
  NOX  CONCENTRATION PPM                              81.2
  HC   MASS (GRAMS)                                  77.29
  CO   MASS (GRAMS)                                1240.84
  CO2  MASS (GRAMS)                                5781.72
  NOX  MASS (GRAMS)                                  58.50

HC   GRAMS/MILE  77.29
CO   GRAMS/MILE  *40.8
CO2  GRAMS/MILE   5782
NOX  GRAMS/MILE  58.50

HC   GRAMS/LB OF FUEL  13.33      HC   GRAMS/MIN   3.85
CO   GRAMS/LB OF FUEL  213.9      CO   GRAMS/MIN   61.9
CO2  GRAMS/LB OF FUEL    997      CO2  GRAMS/MIN    288
NOX  GRAMS/LB OF FUEL  10.09      NOX  GRAMS/MIN   2.92


TOTAL CARBON = 2176.47 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.54 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G3

DATE  8/ 9/79                TIME  1400 HRS.          TEST NO.  3
MODEL  1967   FORD             BOX VAN                ENGINE 300 CID I6
DRIVER  JGC                  TEST WT.  9140 LB.       GVW10000 LB.

WET BULB TEMP  70 F          DRY BULB TEMP  79 F      REL. HUM.  64.1 PCT
SPEC. HUM.  97.8 GRAIN/LB  BARO.  29.15 IN. HG.     MEASURED FUEL  5.82 LB.

  RUN DURATION            19.91 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  12.5  IN. H2O
  BLOWER INLET TEMP.    106  DEG. F
  BLOWER REVOLUTIONS  23051
  BLOWER CU. FT./REV.  .648

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 37.9/3
   HC  SAMPLE  PPM                                  379
   HC  BACKGRD METER READING/SCALE                 13.7/2
   HC  BACKGRD PPM                                   14
   CO  SAMPLE  METER READING/SCALE                 77.1/2
   CO  SAMPLE  PPM                                 3047
   CO  BACKGRD METER READING/SCALE                  1.4/3
   CO  BACKGRD PPM                                   21
   CO2 SAMPLE  METER READING/SCALE                 56.1/3
   CO2 SAMPLE  PERCENT                              .92
   CO2 BACKGRD METER READING/SCALE                  4.4/3
   CO2 BACKGRD PERCENT                              .06
   NOX SAMPLE  METER READING/SCALE                 83.6/2
   NOX SAMPLE  PPM                                 83.6
   NOX BACKGRD METER READING/SCALE                  1.3/2
   NOX BACKGRD PPM                                  1.3

   HC  CONCENTRATION PPM                            367
   CO  CONCENTRATION PPM                           2911
   CO2 CONCENTRATION PCT                            .86
   NOX CONCENTRATION PPM                           82.4
   HC  MASS (GRAMS)                               79.67
   CO  MASS (GRAMS)                             1277.59
   CO2 MASS (GRAMS)                             5977.97
   NOX MASS (GRAMS)                               59.41

HC  GRAMS/MILE  74.67
CO  GRAMS/MILE  *77.6
CO2 GRAMS/MILE   5478
NOX GRAMS/MILE  59.41

HC  GRAMS/LB OF FUEL  13.69     HC  GRAMS/MIN   4.00
CO  GRAMS/LB OF FUEL  219.5     CO  GRAMS/MIN   64.2
CO2 GRAMS/LB OF FUEL   1027     CO2 GRAMS/MIN    300
NOX GRAMS/LB OF FUEL  10.21     NOX GRAMS/MIN   2.98


TOTAL CARBON = 2248.35 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.72 LB.
```

TRUCK G-4

1969 CHEVROLET 18000 LB GVW VAN
WITH 350 CID V8 ENGINE

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G4

DATE  8/20/74               TIME  1100 HRS.          TEST NO.  1
MODEL  1969 CHEVROLET       BOX VAN                  ENGINE 350 CID V8
DRIVER  TLC                 TEST WT. 13475 LB.       GVW18000 LB.

WET BULB TEMP  64 F         DRY BULB TEMP  73 F      REL. HUM.  61.4 PCT
SPEC. HUM.  76.1 GRAIN/LB   BARO.  29.23 IN. HG.     MEASURED FUEL  7. 7 LB.

  RUN DURATION           20.00 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF. PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.      130  DEG. F
  BLOWER REVOLUTIONS  23181
  BLOWER CU. FT./REV.  .642

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  10.4/4
   HC  SAMPLE  PPM                                  1040
   HC  BACKGRD METER READING/SCALE                   6.1/4
   HC  BACKGRD PPM                                    61
   CO  SAMPLE  METER READING/SCALE                  41.8/1
   CO  SAMPLE  PPM                                  3681
   CO  BACKGRD METER READING/SCALE                   4.0/2
   CO  BACKGRD PPM                                   262
   CO2 SAMPLE  METER READING/SCALE                  26.8/2
   CO2 SAMPLE  PERCENT                               .71
   CO2 BACKGRD METER READING/SCALE                   3.0/2
   CO2 BACKGRD PERCENT                               .08
   NOX SAMPLE  METER READING/SCALE                  24.5/3
   NOX SAMPLE  PPM                                  88.5
   NOX BACKGRD METER READING/SCALE                   2.9/3
   NOX BACKGRD PPM                                   8.7

   HC  CONCENTRATION PPM                             984
   CO  CONCENTRATION PPM                            3323
   CO2 CONCENTRATION PCT                             .64
   NOX CONCENTRATION PPM                            80.6
   HC  MASS (GRAMS)                               205.31
   CO  MASS (GRAMS)                              1399.25
   CO2 MASS (GRAMS)                              4274.02
   NOX MASS (GRAMS)                                55.73

HC  GRAMS/MILE  *5.31
CO  GRAMS/MILE  *99.3
CO2 GRAMS/MILE   4274
NOX GRAMS/MILE  55.73

HC  GRAMS/LB OF FUEL  26.77     HC  GRAMS/MIN  10.26
CO  GRAMS/LB OF FUEL  182.4     CO  GRAMS/MIN   69.9
CO2 GRAMS/LB OF FUEL    557     CO2 GRAMS/MIN    214
NOX GRAMS/LB OF FUEL   7.27     NOX GRAMS/MIN   2.79


TOTAL CARBON = 1944.28 GRAMS
CARBON BALANCE FUEL WEIGHT =  4.95 LB.
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                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                            TRUCK NUMBER  G4

DATE  8/20/74                TIME  1300 HRS.           TEST NO.  2
MODEL  1969 CHEVROLET        BOX VAN                   ENGINE 350 CID V8
DRIVER  TLC                  TEST WT. 13475 LB.        GVW18000 LB.

WET BULB TEMP  63 F          DRY BULB TEMP  73 F       REL. HUM.  57.5 PCT
SPEC. HUM.  71.2 GRAIN/LB  BARO.  29.23 IN. HG.      MEASURED FUEL  7.14 LB.

  RUN DURATION            20.00 MINUTES
  BLOWER INLET PRESS.   7.5  IN. H2O
  BLOWER DIF.  PRESS.  13.0  IN. H2O
  BLOWER INLET TEMP.    130  DEG. F
  BLOWER REVOLUTIONS  23149
  BLOWER CU. FT./REV.  .642

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                    98.9/3
   HC  SAMPLE  PPM                                    989
   HC  BACKGRD METER READING/SCALE                     6.4/3
   HC  BACKGRD PPM                                     64
   CO  SAMPLE  METER READING/SCALE                    40.9/1
   CO  SAMPLE  PPM                                   3563
   CO  BACKGRD METER READING/SCALE                     4.6/2
   CO  BACKGRD PPM                                    132
   CO2 SAMPLE  METER READING/SCALE                    38.8/2
   CO2 SAMPLE  PERCENT                               1.06
   CO2 BACKGRD METER READING/SCALE                     3.7/2
   CO2 BACKGRD PERCENT                                .09
   NOX SAMPLE  METER READING/SCALE                    21.3/3
   NOX SAMPLE  PPM                                   63.9
   NOX BACKGRD METER READING/SCALE                     1.1/3
   NOX BACKGRD PPM                                    3.3

   HC  CONCENTRATION PPM                              932
   CO  CONCENTRATION PPM                             3309
   CO2 CONCENTRATION PCT                              .98
   NOX CONCENTRATION PPM                             61.0
   HC  MASS (GRAMS)                                194.15
   CO  MASS (GRAMS)                               1391.39
   CO2 MASS (GRAMS)                               6508.16
   NOX MASS (GRAMS)                                 42.12

HC  GRAMS/MILE  *4.15
CO  GRAMS/MILE  *91.4
CO2 GRAMS/MILE  *6508
NOX GRAMS/MILE  42.12

HC  GRAMS/LB OF FUEL  27.19      HC  GRAMS/MIN   9.71
CO  GRAMS/LB OF FUEL  194.9      CO  GRAMS/MIN   69.6
CO2 GRAMS/LB OF FUEL    912      CO2 GRAMS/MIN    325
NOX GRAMS/LB OF FUEL   5.90      NOX GRAMS/MIN   2.11


TOTAL CARBON = 2540.98 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.47 LB.
```

TRUCK G-5

1967 DODGE 19500 LB GVW STAKE BODY WITH 318 CID V8 ENGINE

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                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                               TRUCK NUMBER  G5

DATE  8/24/74                   TIME  1400 HRS.           TEST NO.  4
MODEL  1967 DODGE               STAKE BED                 ENGINE 318 CID V8
DRIVER  EMR                     TEST WT. 13875 LB.        GVW19500 LB.

WET BULB TEMP  67 F             DRY BULB TEMP  77 F       REL. HUM.  59.6 PCT
SPEC. HUM.  84.7 GRAIN/LB   BARO.  29.18 IN. HG.      MEASURED FUEL  5.64 LB.

  RUN DURATION            19.99 MINUTES
  BLOWER INLET PRESS.    7.0  IN. H2O
  BLOWER DIF.  PRESS.   13.0  IN. H2O
  BLOWER INLET TEMP.     102  DEG. F
  BLOWER REVOLUTIONS  23097
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 52.2/3
   HC   SAMPLE  PPM                                  522
   HC   BACKGRD METER READING/SCALE                  2.5/3
   HC   BACKGRD PPM                                   25
   CO   SAMPLE  METER READING/SCALE                 83.6/2
   CO   SAMPLE  PPM                                 3920
   CO   BACKGRD METER READING/SCALE                  2.4/2
   CO   BACKGRD PPM                                   68
   CO2 SAMPLE  METER READING/SCALE                  29.9/2
   CO2 SAMPLE  PERCENT                                .80
   CO2 BACKGRD METER READING/SCALE                   2.4/2
   CO2 BACKGRD PERCENT                                .06
   NOX SAMPLE  METER READING/SCALE                  47.0/2
   NOX SAMPLE  PPM                                  47.0
   NOX BACKGRD METER READING/SCALE                    .5/3
   NOX BACKGRD PPM                                   1.5

   HC  CONCENTRATION PPM                             499
   CO  CONCENTRATION PPM                            3291
   CO2 CONCENTRATION PCT                             .75
   NOX CONCENTRATION PPM                            45.6
   HC  MASS (GRAMS)                               109.51
   CO  MASS (GRAMS)                              1935.30
   CO2 MASS (GRAMS)                              5211.80
   NOX MASS (GRAMS)                                33.20

HC  GRAMS/MILE  *9.51
CO  GRAMS/MILE  *35.
CO2 GRAMS/MILE   5212
NOX GRAMS/MILE  33.20

HC  GRAMS/LB OF FUEL  19.42      HC  GRAMS/MIN   5.48
CO  GRAMS/LB OF FUEL  254.5      CO  GRAMS/MIN   71.8
CO2 GRAMS/LB OF FUEL    924      CO2 GRAMS/MIN    261
NOX GRAMS/LB OF FUEL   5.89      NOX GRAMS/MIN   1.66


TOTAL CARBON = 2132.71 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.43 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G5

DATE  8/28/74                TIME  1530 HRS.          TEST NO.  5
MODEL  1967 DODGE            STAKE BED                ENGINE 318 CID V8
DRIVER  E**                  TEST WT. 13875 LB.       GVW=19500 LB.

WET BULB TEMP  66 F          DRY BULB TEMP  78 F      REL. HUM.  53.1 PCT
SPEC. HUM.  78.0 GRAIN/LB    BARO.  29.14 IN. HG.     MEASURED FUEL  5.33 LB.

  RUN DURATION           19.80 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      104  DEG. F
  BLOWER REVOLUTIONS   22871
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              45.8/3
   HC   SAMPLE  PPM                               458
   HC   BACKGRD METER READING/SCALE               1.7/3
   HC   BACKGRD PPM                                17
   CO   SAMPLE  METER READING/SCALE              77.9/2
   CO   SAMPLE  PPM                              3091
   CO   BACKGRD METER READING/SCALE               1.8/2
   CO   BACKGRD PPM                                51
   CO2 SAMPLE  METER READING/SCALE               30.7/2
   CO2 SAMPLE  PERCENT                            .82
   CO2 BACKGRD METER READING/SCALE                2.6/2
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               58.0/2
   NOX SAMPLE  PPM                               58.0
   NOX BACKGRD METER READING/SCALE                1.2/3
   NOX BACKGRD PPM                                3.6

   HC  CONCENTRATION PPM                          442
   CO  CONCENTRATION PPM                         2444
   CO2 CONCENTRATION PCT                          .76
   NOX CONCENTRATION PPM                         54.7
   HC  MASS (GRAMS)                             95.66
   CO  MASS (GRAMS)                           1284.91
   CO2 MASS (GRAMS)                           5263.58
   NOX MASS (GRAMS)                             39.23

HC  GRAMS/MILE  95.66
CO  GRAMS/MILE  *84.9
CO2 GRAMS/MILE   5264
NOX GRAMS/MILE  39.23

HC  GRAMS/LB OF FUEL  17.95     HC  GRAMS/MIN   4.83
CO  GRAMS/LB OF FUEL  241.1     CO  GRAMS/MIN   64.9
CO2 GRAMS/LB OF FUEL    988     CO2 GRAMS/MIN    266
NOX GRAMS/LB OF FUEL   7.36     NOX GRAMS/MIN   1.98


TOTAL CARBON = 2070.36 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.27 LB.
```

TRUCK G-6

1968 IHC 27500 LB GVW DUMP BODY
WITH 345 CID V8 ENGINE

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                 TRUCK NUMBER  G6

DATE  9/ 9/74                  TIME  1900 HRS.            TEST NO.  1
MODEL  1968 INTERNATIONAL DUMP TRUCK                      ENGINE 345 CID V8
DRIVER  FGH                    TEST WT. 18960 LB.         GVW=27500 LB.

WET BULB TEMP  64 F            DRY BULB TEMP  73 F        REL. HUM.  61.5 PCT
SPEC. HUM.  76.2 GRAINS/LB     BARO.  29.02 IN. HG.       MEASURED FUEL  5.59 LB.

  RUN DURATION            20.00  MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     13.0  IN. H2O
  BLOWER INLET TEMP.       120  DEG. F
  BLOWER REVOLUTIONS   22884
  BLOWER CU. FT./REV.   .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                      15.8/3
   HC   SAMPLE  PPM                                       158
   HC   BACKGRD METER READING/SCALE                       1.1/3
   HC   BACKGRD PPM                                        11
   CO   SAMPLE  METER READING/SCALE                      50.5/3
   CO   SAMPLE  PPM                                       848
   CO   BACKGRD METER READING/SCALE                        .7/3
   CO   BACKGRD PPM                                        10
   CO2  SAMPLE  METER READING/SCALE                      62.2/4
   CO2  SAMPLE  PERCENT                                  1.19
   CO2  BACKGRD METER READING/SCALE                       2.7/3
   CO2  BACKGRD PERCENT                                   .09
   NOX  SAMPLE  METER READING/SCALE                      54.1/2
   NOX  SAMPLE  PPM                                      54.1
   NOX  BACKGRD METER READING/SCALE                       1.8/2
   NOX  BACKGRD PPM                                       1.8

   HC   CONCENTRATION PPM                                 148
   CO   CONCENTRATION PPM                                 803
   CO2  CONCENTRATION PCT                                1.10
   NOX  CONCENTRATION PPM                                52.5
   HC   MASS (GRAMS)                                    30.51
   CO   MASS (GRAMS)                                   338.55
   CO2  MASS (GRAMS)                                  2319.84
   NOX  MASS (GRAMS)                                    36.32

HC   GRAMS/MILE   30.51
CO   GRAMS/MILE   338.6
CO2  GRAMS/MILE    2320
NOX  GRAMS/MILE   36.32

HC   GRAMS/LB OF FUEL    5.51      HC   GRAMS/MIN    1.53
CO   GRAMS/LB OF FUEL    61.1      CO   GRAMS/MIN    16.9
CO2  GRAMS/LB OF FUEL    1321      CO2  GRAMS/MIN     116
NOX  GRAMS/LB OF FUEL    6.56      NOX  GRAMS/MIN    1.82


TOTAL CARBON = 2169.34 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.52 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  66

DATE  9/ 9/74                  TIME  1400 HRS.          TEST NO.  2
MODEL  1968 INTERNATIONAL      DUMP TRUCK               ENGINE 345 CID V8
DRIVER  EMK                    TEST WT. 18960 LB.       GVW=27500 LB.

WET BULB TEMP  68 F            DRY BULB TEMP  74 F      REL. HUM.  73.8 PCT
SPEC. HUM.  95.8 GRAIN/LB      BARO.  29.00 IN. HG.     MEASURED FUEL  5.71 LB.

  RUN DURATION             19.99 MINUTES
  BLOWER INLET PRESS.       7.5  IN. H2O
  BLOWER DIF.  PRESS.      13.0  IN. H2O
  BLOWER INLET TEMP.        110  DEG. F
  BLOWER REVOLUTIONS     22879
  BLOWER CU. FT./REV.     .645

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                15.2/3
   HC   SAMPLE  PPM                                 152
   HC   BACKGRD METER READING/SCALE                 1.5/3
   HC   BACKGRD PPM                                  15
   CO   SAMPLE  METER READING/SCALE                49.2/3
   CO   SAMPLE  PPM                                 823
   CO   BACKGRD METER READING/SCALE                  .8/3
   CO   BACKGRD PPM                                  12
   CO2  SAMPLE  METER READING/SCALE                66.4/3
   CO2  SAMPLE  PERCENT                            1.12
   CO2  BACKGRD METER READING/SCALE                 4.5/3
   CO2  BACKGRD PERCENT                             .07
   NOX  SAMPLE  METER READING/SCALE                61.9/2
   NOX  SAMPLE  PPM                                61.9
   NOX  BACKGRD METER READING/SCALE                 7.7/2
   NOX  BACKGRD PPM                                 7.7

   HC   CONCENTRATION PPM                           138
   CO   CONCENTRATION PPM                           775
   CO2  CONCENTRATION PCT                          1.06
   NOX  CONCENTRATION PPM                          54.9
   HC   MASS (GRAMS)                              29.41
   CO   MASS (GRAMS)                             332.70
   CO2  MASS (GRAMS)                            7184.13
   NOX  MASS (GRAMS)                              38.70

HC   GRAMS/MILE  29.41
CO   GRAMS/MILE  332.7
CO2  GRAMS/MILE   7184
NOX  GRAMS/MILE  38.70

HC   GRAMS/LB OF FUEL   5.15     HC   GRAMS/MIN   1.47
CO   GRAMS/LB OF FUEL   58.3     CO   GRAMS/MIN   16.6
CO2  GRAMS/LB OF FUEL   1258     CO2  GRAMS/MIN    359
NOX  GRAMS/LB OF FUEL   6.78     NOX  GRAMS/MIN   1.94


TOTAL CARBON = 2128.82 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.42 LB.
```

TRUCK G-7

1965 CHEVROLET 19500 LB GVW VAN
WITH 292 CID I6 ENGINE

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                   EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER  G7

DATE  9/17/74                TIME  1600 HRS.          TEST NO.  1
MODEL  1965 CHEVROLET        BOX VAN                  ENGINE 292 CID I6
DRIVER  EMK                  TEST WT. 14850 LB.       GVW19500 LB.

WET BULB TEMP  70 F          DRY BULB TEMP  80 F      REL. HUM.  61.0 PCT
SPEC. HUM.  96.0 GRAIN/LB    BARO.  29.15 IN. HG.     MEASURED FUEL  5.53 LB.

  RUN DURATION           19.99 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H2O
  BLOWER DIF.  PRESS.    12.5  IN. H2O
  BLOWER INLET TEMP.      106  DEG. F
  BLOWER REVOLUTIONS    23097
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                30.8/3
   HC   SAMPLE  PPM                                 308
   HC   BACKGRD METER READING/SCALE                 2.8/3
   HC   BACKGRD PPM                                  28
   CO   SAMPLE  METER READING/SCALE                80.1/2
   CO   SAMPLE  PPM                                3216
   CO   BACKGRD METER READING/SCALE                 4.6/2
   CO   BACKGRD PPM                                 132
   CO2  SAMPLE  METER READING/SCALE                47.7/3
   CO2  SAMPLE  PERCENT                             .77
   CO2  BACKGRD METER READING/SCALE                 4.4/3
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                49.7/2
   NOX  SAMPLE  PPM                                49.7
   NOX  BACKGRD METER READING/SCALE                 1.5/2
   NOX  BACKGRD PPM                                 1.5

   HC   CONCENTRATION PPM                           282
   CO   CONCENTRATION PPM                          2987
   CO2  CONCENTRATION PCT                           .71
   NOX  CONCENTRATION PPM                          48.3
   HC   MASS (GRAMS)                              61.55
   CO   MASS (GRAMS)                            1314.73
   CO2  MASS (GRAMS)                            4917.51
   NOX  MASS (GRAMS)                              34.94

HC   GRAMS/MILE  61.55
CO   GRAMS/MILE  *14.7
CO2  GRAMS/MILE   4918
NOX  GRAMS/MILE  34.94

HC   GRAMS/LB OF FUEL  11.13      HC   GRAMS/MIN   3.08
CO   GRAMS/LB OF FUEL  237.7      CO   GRAMS/MIN   65.8
CO2  GRAMS/LB OF FUEL    889      CO2  GRAMS/MIN    246
NOX  GRAMS/LB OF FUEL   6.32      NOX  GRAMS/MIN   1.75


TOTAL CARBON = 1959.16 GRAMS
CARBON BALANCE FUEL WEIGHT =  4.99 LB.
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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G7

DATE  9/17/74               TIME  1700 HRS.          TEST NO.  2
MODEL  1965 CHEVROLET       BOX VAN                  ENGINE 292 CID I6
DRIVER  EMK                 TEST WT. 14850 LB.       GV=19500 LB.

WET BULB TEMP  73 F         DRY BULB TEMP  82 F      REL. HUM.  65.3 PCT
SPEC. HUM.  *0.1 GRAIN/LB   BARO.  29.15 IN. HG.     MEASURED FUEL  5.48 LB.

  RUN DURATION           20.01 MINUTES
  BLOWER INLET PRESS.     7.0  IN. H20
  BLOWER DIF.  PRESS.    12.5  IN. H20
  BLOWER INLET TEMP.      106  DEG. F
  BLOWER REVOLUTIONS   23953
  BLOWER CU. FT./REV.   .649

  BAG RESULTS
   HC   SAMPLF  METER READING/SCALE             29.6/3
   HC   SAMPLE  PPM                              296
   HC   BACKGRD METER READING/SCALE              2.4/3
   HC   BACKGRD PPM                               24
   CO   SAMPLE  METER READING/SCALE             79.9/2
   CO   SAMPLE  PPM                             3204
   CO   BACKGRD METER READING/SCALE              1.3/2
   CO   BACKGRD PPM                               37
   CO2  SAMPLE  METER READING/SCALE             47.7/3
   CO2  SAMPLE  PERCENT                          .77
   CO2  BACKGRD METER READING/SCALE              3.9/3
   CO2  BACKGRD PERCENT                          .06
   NOX  SAMPLE  METER READING/SCALE             50.9/2
   NOX  SAMPLE  PPM                             50.9
   NOX  BACKGRD METER READING/SCALE              1.6/2
   NOX  BACKGRD PPM                              1.6

   HC   CONCENTRATION PPM                        274
   CO   CONCENTRATION PPM                       3057
   CO2  CONCENTRATION PCT                        .71
   NOX  CONCENTRATION PPM                       49.4
   HC   MASS (GRAMS)                           62.12
   CO   MASS (GRAMS)                         1399.33
   CO2  MASS (GRAMS)                         5162.43
   NOX  MASS (GRAMS)                           37.17

HC   GRAMS/MILE  62.12
CO   GRAMS/MILE  *99.3
CO2  GRAMS/MILE   5162
NOX  GRAMS/MILE  37.17

HC   GRAMS/LB OF FUEL  11.34     HC   GRAMS/MIN   3.10
CO   GRAMS/LB OF FUEL  255.4     CO   GRAMS/MIN   69.9
CO2  GRAMS/LB OF FUEL    942     CO2  GRAMS/MIN    258
NOX  GRAMS/LB OF FUEL   6.78     NOX  GRAMS/MIN   1.86


TOTAL CARBON = 2062.77 GRAMS
CARBON BALANCE FUEL WEIGHT =  5.25 LB.
```

TRUCK G-8

1965 GMC 19500 LB GVW VAN
WITH 351 CID V6 ENGINE

```
                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G8

DATE 10/ 1/74               TIME  1900 HRS.          TEST NO.  1
MODEL  1965 GMC             MOVING VAN               ENGINE 351 CID V6
DRIVER  EMK                 TEST WT. 16000 LB.       GVW19500 LB.

WET BULB TEMP  62 F         DRY BULB TEMP  76 F      REL. HUM.  44.8 PCT
SPEC. HUM.  60.7 GRAIN/LB  BARO.  29.48 IN. HG.     MEASURED FUEL  7.68 LB.

  RUN DURATION           20.04 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H20
  BLOWER DIF.  PRESS.   13.0  IN. H20
  BLOWER INLET TEMP.      98  DEG. F
  BLOWER REVOLUTIONS  23250
  BLOWER CU. FT./REV.   .646

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   49.4/3
   HC   SAMPLE  PPM                                    494
   HC   BACKGRD METER READING/SCALE                    3.1/3
   HC   BACKGRD PPM                                     31
   CO   SAMPLE  METER READING/SCALE                   80.1/2
   CO   SAMPLE  PPM                                   3216
   CO   BACKGRD METER READING/SCALE                    1.3/2
   CO   BACKGRD PPM                                     37
   CO2  SAMPLE  METER READING/SCALE                   58.7/3
   CO2  SAMPLE  PERCENT                                .97
   CO2  BACKGRD METER READING/SCALE                    3.6/3
   CO2  BACKGRD PERCENT                                .05
   NOX  SAMPLE  METER READING/SCALE                   67.2/2
   NOX  SAMPLE  PPM                                   67.2
   NOX  BACKGRD METER READING/SCALE                    1.5/2
   NOX  BACKGRD PPM                                    1.5

   HC   CONCENTRATION PPM                              466
   CO   CONCENTRATION PPM                             3077
   CO2  CONCENTRATION PCT                              .92
   NOX  CONCENTRATION PPM                             65.8
   HC   MASS (GRAMS)                                104.61
   CO   MASS (GRAMS)                               1394.19
   CO2  MASS (GRAMS)                               6603.22
   NOX  MASS (GRAMS)                                 49.02

HC   GRAMS/MILE  *9.61
CO   GRAMS/MILE  *94.2
CO2  GRAMS/MILE   6603
NOX  GRAMS/MILE  49.02

HC   GRAMS/LB OF FUEL  13.62      HC   GRAMS/MIN   5.22
CO   GRAMS/LB OF FUEL  181.5      CO   GRAMS/MIN   69.6
CO2  GRAMS/LB OF FUEL    860      CO2  GRAMS/MIN    329
NOX  GRAMS/LB OF FUEL   6.38      NOX  GRAMS/MIN   2.45


TOTAL CARBON = 2490.58 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.34 LB.
```

```
                 EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER  G8

DATE 10/ 1/79               TIME  1330 HRS.         TEST NO.  2
MODEL  1965 GMC             MOVING VAN              ENGINE 351 CID V6
DRIVER  ERK                 TEST WT. 16000 LB.      GVW19500 LB.

WET BULB TEMP  63 F         DRY BULB TEMP  80 F     REL. HUM.  38.0 PCT
SPEC. HUM.  58.8 GRAIN/LB   BARO.  29.46 IN. HG.    MEASURED FUEL  7.10 LB.

  RUN DURATION           19.99 MINUTES
  BLOWER INLET PRESS.     7.5  IN. H2O
  BLOWER DIF.  PRESS.    13.0  IN. H2O
  BLOWER INLET TEMP.      102  DEG. F
  BLOWER REVOLUTIONS    23195
  BLOWER CU. FT./REV.    .647

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               49.9/3
   HC  SAMPLE  PPM                                499
   HC  BACKGRD METER READING/SCALE                2.6/3
   HC  BACKGRD PPM                                 26
   CO  SAMPLE  METER READING/SCALE               81.8/2
   CO  SAMPLE  PPM                               3314
   CO  BACKGRD METER READING/SCALE                 .9/2
   CO  BACKGRD PPM                                 25
   CO2 SAMPLE  METER READING/SCALE               60.5/3
   CO2 SAMPLE  PERCENT                           1.00
   CO2 BACKGRD METER READING/SCALE                4.0/3
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               66.7/2
   NOX SAMPLE  PPM                               66.7
   NOX BACKGRD METER READING/SCALE                1.0/2
   NOX BACKGRD PPM                                1.0

   HC  CONCENTRATION PPM                          476
   CO  CONCENTRATION PPM                         3187
   CO2 CONCENTRATION PCT                          .95
   NOX CONCENTRATION PPM                         65.8
   HC  MASS (GRAMS)                            105.75
   CO  MASS (GRAMS)                           1430.50
   CO2 MASS (GRAMS)                           6749.61
   NOX MASS (GRAMS)                             48.52

HC  GRAMS/MILE  *5.75
CO  GRAMS/MILE  *30.5
CO2 GRAMS/MILE   6750
NOX GRAMS/MILE  48.52

HC  GRAMS/LB OF FUEL  14.90     HC  GRAMS/MIN   5.29
CO  GRAMS/LB OF FUEL  201.5     CO  GRAMS/MIN   71.5
CO2 GRAMS/LB OF FUEL    951     CO2 GRAMS/MIN    338
NOX GRAMS/LB OF FUEL   6.83     NOX GRAMS/MIN   2.43


TOTAL CARBON = 2547.10 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.48 LB.
```

TRUCK G-9

1966 CHEVROLET 34000 LB GCW TRACTOR WITH 366 CID V8 ENGINE

```
                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G9

DATE 10/ 8/74                 TIME  1335 HRS.          TEST NO.  1
MODEL  1966 CHEVROLET         TRACTOR                  ENGINE 366 CID V8
DRIVER  FRK                   TEST WT. 22700 LB.       GV=34000 LB.

WET BULB TEMP  66 F           DRY BULB TEMP  79 F      REL. HUM.  50.2 PCT
SPEC. HUM.  75.5 GRAIN/LB     BARO.  29.36 IN. HG.     MEASURED FUEL  6.93 LB.

  RUN DURATION           20.01 MINUTES
  BLOWER INLET PRESS.    7.5  IN. H20
  BLOWER DIF.  PRESS.   12.5  IN. H20
  BLOWER INLET TEMP.     102  DEG. F
  BLOWER REVOLUTIONS  23220
  BLOWER CU. FT./REV.   .648

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  45.5/3
   HC   SAMPLE  PPM                                   455
   HC   BACKGRD METER READING/SCALE                   1.4/3
   HC   BACKGRD PPM                                    14
   CO   SAMPLE  METER READING/SCALE                  51.5/2
   CO   SAMPLE  PPM                                  1795
   CO   BACKGRD METER READING/SCALE                    .3/2
   CO   BACKGRD PPM                                     0
   CO2  SAMPLE  METER READING/SCALE                  69.1/3
   CO2  SAMPLE  PERCENT                              1.17
   CO2  BACKGRD METER READING/SCALE                   4.0/3
   CO2  BACKGRD PERCENT                               .06
   NOX  SAMPLE  METER READING/SCALE                  38.1/3
   NOX  SAMPLE  PPM                                 114.3
   NOX  BACKGRD METER READING/SCALE                    .5/3
   NOX  BACKGRD PPM                                   1.5

   HC   CONCENTRATION PPM                             442
   CO   CONCENTRATION PPM                            1718
   CO2  CONCENTRATION PCT                            1.12
   NOX  CONCENTRATION PPM                           113.0
   HC   MASS (GRAMS)                                98.28
   CO   MASS (GRAMS)                               770.32
   CO2  MASS (GRAMS)                              7943.32
   NOX  MASS (GRAMS)                                83.22

HC   GRAMS/MILE  98.28
CO   GRAMS/MILE  770.3
CO2  GRAMS/MILE   7943
NOX  GRAMS/MILE  83.22

HC   GRAMS/LB OF FUEL  14.18      HC   GRAMS/MIN   4.91
CO   GRAMS/LB OF FUEL  111.2      CO   GRAMS/MIN   38.5
CO2  GRAMS/LB OF FUEL   1146      CO2  GRAMS/MIN    397
NOX  GRAMS/LB OF FUEL  12.01      NOX  GRAMS/MIN   4.16


TOTAL CARBON = 2583.33 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.88 LB.
```

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                                TRUCK NUMBER  G9

DATE 10/ 8/74                 TIME  1435 HRS.          TEST NO.  2
MODEL  1966 CHEVROLET         TRACTOR                  ENGINE 366 CID V8
DRIVER  ERK                   TEST WT. 22700 LB.       GVW=34000 LB.

WET BULB TEMP  62 F           DRY BULB TEMP  74 F      REL. HUM.  50.6 PCT
SPEC. HUM.  64.4 GRAIN/LB  BARO.  29.36 IN. HG.      MEASURED FUEL  6.49 LB.

  RUN DURATION            20.01 MINUTES
  BLOWER INLET PRESS.      7.5  IN. H2O
  BLOWER DIF.  PRESS.     12.5  IN. H2O
  BLOWER INLET TEMP.       104  DEG. F
  BLOWER REVOLUTIONS     23204
  BLOWER CU. FT./REV.     .648

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  45.0/3
   HC   SAMPLE  PPM                                   450
   HC   BACKGRD METER READING/SCALE                    1.6/3
   HC   BACKGRD PPM                                    16
   CO   SAMPLE  METER READING/SCALE                  44.1/2
   CO   SAMPLE  PPM                                  1692
   CO   BACKGRD METER READING/SCALE                    .3/2
   CO   BACKGRD PPM                                      8
   CO2  SAMPLE  METER READING/SCALE                  68.4/3
   CO2  SAMPLE  PERCENT                              1.16
   CO2  BACKGRD METER READING/SCALE                   4.3/3
   CO2  BACKGRD PERCENT                               .06
   NOX  SAMPLE  METER READING/SCALE                  37.3/3
   NOX  SAMPLE  PPM                                 112.9
   NOX  BACKGRD METER READING/SCALE                   .4/3
   NOX  BACKGRD PPM
                                                      2.2

  HC   CONCENTRATION PPM                              436
  CO   CONCENTRATION PPM                             1619
  CO2  CONCENTRATION PCT                             1.10
  NOX  CONCENTRATION PPM                            110.8
  HC   MASS (GRAMS)                                 96.38
  CO   MASS (GRAMS)                                723.34
  CO2  MASS (GRAMS)                               7783.47
  NOX  MASS (GRAMS)
                                                    81.31
HC   GRAMS/MILE   96.38
CO   GRAMS/MILE   723.3
CO2  GRAMS/MILE    7783
NOX  GRAMS/MILE   81.31

HC   GRAMS/LB OF FUEL  14.85     HC   GRAMS/MIN    4.82
CO   GRAMS/LB OF FUEL  111.5     CO   GRAMS/MIN    36.1
CO2  GRAMS/LB OF FUEL   1199     CO2  GRAMS/MIN     389
NOX  GRAMS/LB OF FUEL  12.53     NOX  GRAMS/MIN    4.06


TOTAL CARBON = 2517.90 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.41 LB.
```

TRUCK G-10

1969 FORD 43500 LB GCW TRACTOR WITH 391 CID V8 ENGINE

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                    EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                              TRUCK NUMBER G10

DATE 10/15/74               TIME  1400 HRS,         TEST NO.  1
MODEL  1969 FORD            TRACTOR                 ENGINE 391 CID V8
DRIVER  ERK                 TEST WT, 28900 LB,      GVW43500 LB,

WET BULB TEMP  56 F         DRY BULB TEMP  71 F     REL. HUM.  37.6 PCT
SPEC. HUM.  42.8 GRAIN/LB   BARO.  29.46 IN. HG.    MEASURED FUEL  7.45 LB.

  RUN DURATION           20.00 MINUTES
  BLOWER INLET PRESS,     8.0  IN. H2O
  BLOWER DIF.  PRESS,    14.0  IN. H2O
  BLOWER INLET TEMP,      126  DEG. F
  BLOWER REVOLUTIONS  23235
  BLOWER CU. FT./REV,  .642

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE            35.7/3
   HC  SAMPLE  PPM                             357
   HC  BACKGRD METER READING/SCALE             1.0/3
   HC  BACKGRD PPM                              10
   CO  SAMPLE  METER READING/SCALE            93.6/2
   CO  SAMPLE  PPM                            4094
   CO  BACKGRD METER READING/SCALE              .3/2
   CO  BACKGRD PPM                               8
   CO2 SAMPLE  METER READING/SCALE            59.7/3
   CO2 SAMPLE  PERCENT                         .99
   CO2 BACKGRD METER READING/SCALE             3.4/3
   CO2 BACKGRD PERCENT                         .05
   NOX SAMPLE  METER READING/SCALE            45.2/2
   NOX SAMPLE  PPM                            45.2
   NOX BACKGRD METER READING/SCALE              .8/2
   NOX BACKGRD PPM                              .8

   HC  CONCENTRATION PPM                      348
   CO  CONCENTRATION PPM                     3915
   CO2 CONCENTRATION PCT                      .94
   NC  CONCENTRATION PPM                     44.5
   HC  MASS (GRAMS)                         73.73
   CO  MASS (GRAMS)                       1679.36
   CO2 MASS (GRAMS)                       6381.06
   NOX MASS (GRAMS)                         31.25

HC  GRAMS/MILE  73.73
CO  GRAMS/MILE  *79.4
CO2 GRAMS/MILE   6381
NOX GRAMS/MILE  31.25

HC  GRAMS/LB OF FUEL   9.90     HC  GRAMS/MIN   3.69
CO  GRAMS/LB OF FUEL  224.7     CO  GRAMS/MIN   83.7
CO2 GRAMS/LB OF FUEL    857     CO2 GRAMS/MIN    319
NOX GRAMS/LB OF FUEL   4.19     NOX GRAMS/MIN   1.56


TOTAL CARBON = 2523.35 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.42 LB,
                EXHAUST EMISSIONS FROM SAN ANTONIO ROAD ROUTE
                             TRUCK NUMBER G10

DATE 10/15/74                TIME  1530 HRS.        TEST NO.  2
MODEL  1969 FORD             TRACTOR                ENGINE 391 CID V8
DRIVER  FRK                  TEST WT. 28900 LB.     GVW43500 LB.

WET BULB TEMP  57 F          DRY BULB TEMP  73 F    REL. HUM.  35.8 PCT
SPEC. HUM.  43.7 GRAIN/LB  BARO.  29.46 IN. HG.   MEASURED FUEL  6.99 LB.

  RUN DURATION          20.01 MINUTES
  BLOWER INLET PRESS.    8.0  IN. H2O
  BLOWER DIF.  PRESS.   14.0  IN. H2O
  BLOWER INLET TEMP.     126  DEG. F
  BLOWER REVOLUTIONS  23215
  BLOWER CU. FT./REV.   .642

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              36.4/3
   HC   SAMPLE  PPM                               364
   HC   BACKGRD METER READING/SCALE               1.2/3
   HC   BACKGRD PPM                                12
   CO   SAMPLE  METER READING/SCALE              94.2/2
   CO   SAMPLE  PPM                              4089
   CO   BACKGRD METER READING/SCALE                .7/2
   CO   BACKGRD PPM                                20
   CO2 SAMPLE  METER READING/SCALE              58.5/3
   CO2 SAMPLE  PERCENT                            .97
   CO2 BACKGRD METER READING/SCALE               2.5/3
   CO2 BACKGRD PERCENT                            .04
   NOX SAMPLE  METER READING/SCALE              45.1/2
   NOX SAMPLE  PPM                               45.1
   NOX BACKGRD METER READING/SCALE                .6/2
   NOX BACKGRD PPM                                 .6

   HC   CONCENTRATION PPM                         353
   CO   CONCENTRATION PPM                        3448
   CO2 CONCENTRATION PCT                          .93
   NOX CONCENTRATION PPM                         44.6
   HC   MASS (GRAMS)                            74.76
   CO   MASS (GRAMS)                          1686.79
   CO2 MASS (GRAMS)                          6298.68
   NOX MASS (GRAMS)                             31.28

HC   GRAMS/MILE   74.76
CO   GRAMS/MILE   *86.8
CO2 GRAMS/MILE    6299
NOX GRAMS/MILE   31.28

HC   GRAMS/LB OF FUEL  10.69     HC   GRAMS/MIN   3.74
CO   GRAMS/LB OF FUEL  241.3     CO   GRAMS/MIN   84.3
CO2 GRAMS/LB OF FUEL    901     CO2 GRAMS/MIN    315
NOX GRAMS/LB OF FUEL   4.47     NOX GRAMS/MIN   1.56


TOTAL CARBON = 2507.09 GRAMS
CARBON BALANCE FUEL WEIGHT =  6.38 LB.
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APPENDIX I. TRUCK OPERATIONAL PERFORMANCE ON THE SAN ANTONIO ROAD ROUTE FOR TEN PRECONTROLLED GASOLINE POWERED TRUCKS (BY RUN FOR EACH TRUCK)

TRUCK G-1. 1976 FORD 17000 GVW VAN WITH 330 CID V8 ENGINE

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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 19.49 MIN., IDLE SPEED 550 RPM, 7/19/74  RUN 1

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM        RANGE
RPM   1    1544.8135    715.9713        7.1312   10080      3460.0000    340.0000    3120.0000
MV    2      13.6672      7.9548         .0792   10080        24.9750       .0000      24.9750
SPD   3      22.9900     15.2526         .1519   10080        62.0003       .0000      62.0003
TP    4       2.2223      2.4827         .0247   10080         8.6500       .0000       8.6500

                                   PERCENT OF TIME                  PERCENT OF TIME
                                   THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT    GEAR    COUNT   PERCENT


                                   CLOSED         4212     41.79       1        0       .00
                                      WOT            0       .00       2        0       .00
                                                                       3        0       .00
                                                                       4        0       .00
                                                                       5        0       .00
                                                                       6        0       .00
                                                                       7        0       .00

 PERCENT OF TIME  MV AT                    PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT            LEVEL          COUNT   PERCENT            LEVEL            COUNT   PERCENT
         <                                          <                                            <
   . -  1.        032      8.25               . -  2.      1668     16.55                   . -  200.        0       .00
  1. -  2.        345      3.42              2. -  4.       125      1.24               200. -  400.        9       .09
  2. -  3.        368      3.65              4. -  6.       138      1.37               400. -  600.      982      9.74
  3. -  4.        253      2.51              6. -  8.       159      1.58               600. -  800.     1204     11.94
  4. -  5.        257      2.55              8. - 10.       193      1.91               800. - 1000.      427      4.24
  5. -  6.        308      3.06             10. - 12.       203      2.01              1000. - 1200.      670      6.65
  6. -  7.        258      2.56             12. - 14.       194      1.92              1200. - 1400.      917      9.10
  7. -  8.        300      2.98             14. - 16.       306      3.04              1400. - 1600.     1062     10.54
  8. -  9.        342      3.39             16. - 18.       434      4.31              1600. - 1800.     1468     14.56
  9. - 10.        298      2.96             18. - 20.       606      6.01              1800. - 2000.     1184     11.75
 10. - 11.        290      2.88             20. - 22.       515      5.11              2000. - 2200.      393      3.90
 11. - 12.        364      3.61             22. - 24.       595      5.90              2200. - 2400.      279      2.77
 12. - 13.        369      3.66             24. - 26.       506      5.02              2400. - 2600.      315      3.12
 13. - 14.        236      2.34             26. - 28.       492      4.88              2600. - 2800.      321      3.18
 14. - 15.        209      2.07             28. - 30.       634      6.29              2800. - 3000.      652      6.47
 15. - 16.        256      2.54             30. - 32.       770      7.64              3000. - 3200.      179      1.78
 16. - 17.        286      2.84             32. - 34.       641      6.36              3200. - 3400.       14       .14
 17. - 18.        229      2.27             34. - 36.       487      4.83              3400. - 3600.        4       .04
 18. - 19.        270      2.68             36. - 38.       269      2.67              3600. - 3600.        0       .00
 19. - 20.        636      6.31             38. - 40.        46       .46              3800. - 4000.        0       .00
 20. - 21.       1545     15.33             40. - 42.        31       .31              4000. - 4200.        0       .00
 21. - 22.        349      3.46             42. - 44.        55       .55              4200. - 4400.        0       .00
 22. - 23.        289      2.87             44. - 46.        62       .62              4400. - 4600.        0       .00
 23. - 24.        404      4.01             46. - 48.       101      1.00              4600. - 4800.        0       .00
 24. - 25.        787      7.81             48. - 50.       102      1.01              4800. - 5000.        0       .00
 25. - 26.          0       .00             50. - 52.       119      1.18
 26. - 27.          0       .00             52. - 54.       192      1.90
 27. - 28.          0       .00             54. - 56.       279      2.77
 28. - 29.          0       .00             56. - 58.       110      1.09
 29. - 30.          0       .00             58. - 60.        39       .39
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 20.22 MIN., IDLE SPEED 550 RPM, 7/19/74  RUN 2

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1537.8865     711.2067       6.9740  10400       3695.0000     380.0000   3315.0000
MV    2      13.8604       8.0929        .0794  10400         24.9750        .0000     24.9750
SPD   3      22.1468      15.4560        .1516  10400         63.2003        .0000     63.2003
TP    4       1.9770       2.3268        .0228  10400          8.2600        .0000      8.2600

                                     PERCENT OF TIME                PERCENT OF TIME
                                    THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                    LEVEL          COUNT   PERCENT    GEAR    COUNT   PERCENT


                                    CLOSED          4604     44.27       1        0       .00
                                       WOT             0       .00       2        0       .00
                                                                         3        0       .00
                                                                         4        0       .00
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        0       .00

 PERCENT OF TIME  MV AT                PERCENT OF TIME  #S AT                  PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT          LEVEL           COUNT   PERCENT
        <                                     <                                         <
    . -  1.      1036      9.96             . -  2.      1930     18.56                 . -  200.       0        .00
   1. -  2.       289      2.78            2. -  4.        94       .90              200. -  400.       2        .02
   2. -  3.       277      2.66            4. -  6.        99       .95              400. -  600.     532       5.12
   3. -  4.       350      3.37            6. -  8.       177      1.70              600. -  800.    1796      17.27
   4. -  5.       237      2.28            8. - 10.       242      2.33              800. - 1000.     354       3.40
   5. -  6.       223      2.14           10. - 12.       227      2.18             1000. - 1200.     579       5.57
   6. -  7.       208      2.77           12. - 14.       324      3.12             1200. - 1400.    1129      10.86
   7. -  8.       238      2.29           14. - 16.       326      3.13             1400. - 1600.    1425      13.70
   8. -  9.       280      2.69           16. - 18.       478      4.60             1600. - 1800.    1474      14.17
   9. - 10.       353      3.39           18. - 20.       421      4.05             1800. - 2000.    1088      10.46
  10. - 11.       328      3.15           20. - 22.       468      4.50             2000. - 2200.     403       3.87
  11. - 12.       262      2.52           22. - 24.       601      5.78             2200. - 2400.     229       2.20
  12. - 13.       288      2.77           24. - 26.       678      6.52             2400. - 2600.     167       1.61
  13. - 14.       301      2.89           26. - 28.       621      5.97             2600. - 2800.     189       1.82
  14. - 15.       268      2.58           28. - 30.       880      8.46             2800. - 3000.     587       5.64
  15. - 16.       330      3.17           30. - 32.       561      5.39             3000. - 3200.     384       3.69
  16. - 17.       276      2.65           32. - 34.       541      5.20             3200. - 3400.      42        .40
  17. - 18.       251      2.41           34. - 36.       349      3.36             3400. - 3600.      17        .16
  18. - 19.       203      1.95           36. - 38.       231      2.22             3600. - 3800.       3        .03
  19. - 20.       691      6.64           38. - 40.        80       .77             3800. - 4000.       0        .00
  20. - 21.      1435     13.80           40. - 42.        29       .28             4000. - 4200.       0        .00
  21. - 22.       615      5.91           42. - 44.        29       .28             4200. - 4400.       0        .00
  22. - 23.       241      2.32           44. - 46.        24       .23             4400. - 4600.       0        .00
  23. - 24        466      4.48           46. - 48.        48       .46             4600. - 4800.       0        .00
  24. - 25.       874      8.40           48. - 50.        60       .58             4800. - 5000.       0        .00
  25. - 26.         0       .00           50. - 52.       181      1.74
  26. - 27.         0       .00           52. - 54.       285      2.74
  27. - 28.         0       .00           54. - 56.       230      2.21
  28. - 29.         0       .00           56. - 58.       146      1.40
  29. - 30.         0       .00           58. - 60.        28       .27
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 20.96 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 3

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1550.5723     688.4557        6.5642  11000        4485.0000     450.0000   4035.0000
MV    2      14.3093       7.8451         .0748  11000          24.9750        .0000     24.9750
SPD   3      21.5452      14.5603         .1388  11000          57.9336        .0000     57.9336
TP    4       1.9768       2.3498         .0224  11000           9.9900        .0000      9.9900

                                        PERCENT OF TIME                 PERCENT OF TIME
                                       THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                       LEVEL         COUNT   PERCENT   GEAR    COUNT   PERCENT


                                       CLOSED         4561     41.46      1        2       .07
                                          WOT          139      1.26      2     1220     44.36
                                                                          3      360     13.09
                                                                          4     1026     37.31
                                                                          5        0       .00
                                                                          6        0       .00
                                                                          7        1       .04

PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT            LEVEL          COUNT   PERCENT
        <                                       <                                         <
  . -  1.        845      7.68            . -  2.       1883     17.12                . -  200.       0       .00
 1. -  2.        465      4.23           2. -  4.        194      1.76            200. -  400.       0       .00
 2. -  3.        187      1.70           4. -  6.        141      1.28            400. -  600.     613      5.57
 3. -  4.        209      1.90           6. -  8.        148      1.35            600. -  800.    1806     16.42
 4. -  5.        221      2.01           8. - 10.        354      3.22            800. - 1000.     301      2.74
 5. -  6.        339      3.08          10. - 12.        475      4.32           1000. - 1200.     783      7.12
 6. -  7.        325      2.95          12. - 14.        379      3.45           1200. - 1400.     880      8.00
 7. -  8.        316      2.87          14. - 16.        340      3.09           1400. - 1600.    1320     12.00
 8. -  9.        383      3.48          16. - 18.        385      3.50           1600. - 1600.    1717     15.61
 9. - 10.        285      2.59          18. - 20.        329      2.99           1800. - 2000.    1249     11.35
10. - 11.        277      2.52          20. - 22.        586      5.33           2000. - 2200.     478      4.35
11. - 12.        344      3.13          22. - 24.        457      4.15           2200. - 2400.     243      2.21
12. - 13.        216      1.96          24. - 26.        594      5.40           2400. - 2600.     469      4.26
13. - 14.        221      2.01          26. - 28.        569      5.17           2600. - 2800.     585      5.32
14. - 15.        250      2.27          26. - 30.       1041      9.46           2800. - 3000.     386      3.51
15. - 16.        334      3.04          30. - 32.        917      8.34           3000. - 3200.     114      1.04
16. - 17.        298      2.71          32. - 34.        546      4.96           3200. - 3400.      31       .28
17. - 18.        344      3.13          34. - 36.        331      3.01           3400. - 3600.       7       .06
18. - 19.        323      2.94          36. - 38.        149      1.35           3600. - 3600.       3       .03
19. - 20.        838      7.62          38. - 40.         40       .36           3800. - 4000.       2       .02
20. - 21.       1711     15.55          40. - 42.         20       .18           4000. - 4200.       5       .05
21. - 22.        635      5.77          42. - 44.         34       .31           4200. - 4400.       4       .04
22. - 23.        478      4.35          44. - 46.        188      1.71           4400. - 4600.       4       .04
23. - 24.        448      4.07          46. - 48.        319      2.90           4600. - 4800.       0       .00
24. - 25.        708      6.44          48. - 50.        280      2.55           4800. - 5000.       0       .00
25. - 26.          0       .00          50. - 52.        151      1.37
26. - 27.          0       .00          52. - 54.         84       .76
27. - 28.          0       .00          54. - 56.         57       .52
28. - 29.          0       .00          56. - 58.          9       .08
29. - 30.          0       .00          58. - 60.          0       .00
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW. TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 21.69 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 4

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM      RANGE
RPM   1   1453.0251    678.9626        6.3815  11320      3465.0000    295.0000   3170.0000
MV    2     14.9745      7.7990         .0733  11320        24.9750       .0000     24.9750
SPD   3     20.9748     14.4585         .1359  11320        57.5336       .0000     57.5336
TP    4      2.0566      2.5959         .0244  11320         9.9300       .0000      9.9300

                                  PERCENT OF TIME                 PERCENT OF TIME
                                 THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT


                                 CLOSED        5515     48.72       1        0       .00
                                    WOT         255      2.25       2      747     26.40
                                                                    3      732     25.87
                                                                    4     1347     47.60
                                                                    5        0       .00
                                                                    6        0       .00
                                                                    7        4       .14

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT            LEVEL           COUNT   PERCENT
        <                                          <                                           <
   . -   1.       548      4.84               . -  2.     1878     16.59                 . -  200.       0       .00
  1. -   2.       451      3.98              2. -  4.      178      1.57             200. -  400.       4       .04
  2. -   3.       371      3.28              4. -  6.      190      1.68             400. -  600.     842      7.44
  3. -   4.       300      2.65              6. -  8.      233      2.06             600. -  800.    2253     19.90
  4. -   5.       248      2.19              8. - 10.      310      2.74             800. - 1000.     406      3.59
  5. -   6.       270      2.39             10. - 12.      407      3.60            1000. - 1200.     749      6.62
  6. -   7.       283      2.50             12. - 14.      613      5.42            1200. - 1400.    1082      9.56
  7. -   8.       346      3.06             14. - 16.      649      5.73            1400. - 1600.    1237     10.93
  8. -   9.       273      2.41             16. - 18.      485      4.28            1600. - 1800.    1447     12.78
  9. -  10.       288      2.54             18. - 20.      448      3.96            1800. - 2000.    1036      9.15
 10. -  11.       270      2.39             20. - 22.      519      4.58            2000. - 2200.     395      3.49
 11. -  12.       280      2.47             22. - 24.      443      3.91            2200. - 2400.     419      3.70
 12. -  13.       277      2.45             24. - 26.      515      4.55            2400. - 2600.     561      4.96
 13. -  14.       261      2.31             26. - 28.      563      4.97            2600. - 2800.     683      6.03
 14. -  15.       199      1.76             28. - 30.      639      5.64            2800. - 3000.     185      1.63
 15. -  16.       265      2.34             30. - 32.      722      6.38            3000. - 3200.      17       .15
 16. -  17.       267      2.36             32. - 34.      708      6.25            3200. - 3400.       3       .03
 17. -  18.       181      1.60             34. - 36.      349      3.08            3400. - 3600.       1       .01
 18. -  19.       474      4.19             36. - 38.      191      1.69            3600. - 3800.       0       .00
 19. -  20.      1622     14.33             38. - 40.       79       .70            3800. - 4000.       0       .00
 20. -  21.      1338     11.82             40. - 42.       62       .55            4000. - 4200.       0       .00
 21. -  22.       328      2.90             42. - 44.      181      1.60            4200. - 4400.       0       .00
 22. -  23.       365      3.22             44. - 46.      193      1.70            4400. - 4600.       0       .00
 23. -  24.       612      5.41             46. - 48.      179      1.58            4600. - 4800.       0       .00
 24. -  25.      1203     10.63             48. - 50.      306      2.70            4800. - 5000.       0       .00
 25. -  26.         0       .00             50. - 52.      182      1.61
 26. -  27.         0       .00             52. - 54.       58       .51
 27. -  28.         0       .00             54. - 56.       35       .31
 28. -  29.         0       .00             56. - 58.        5       .04
 29. -  30.         0       .00             58. - 60.        0       .00
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1967 FORD BOX VAN WITH 330 CID V8. 17000 LB GVW. TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 19.39 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 5

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1563.4480   663.7933        6.6646    9920      3305.0000        .0000   3305.0000
MV    2     13.7539     8.3269         .0836    9920        24.9750        .0000     24.9750
SPD   3     23.7145    14.3626         .1442    9920        58.8003        .0000     58.8003
TP    4      2.3202     2.6065         .0262    9920         9.2100        .0000      9.2100

                                    PERCENT OF TIME                    PERCENT OF TIME
                                   THROTTLE POSITION AT               GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT      GEAR    COUNT   PERCENT


                                   CLOSED         4385     44.20         1        0       .00
                                      WOT           26       .26         2      496     20.00
                                                                         3      337     13.59
                                                                         4     1639     66.09
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        6       .24

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  MS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT            LEVEL            COUNT   PERCENT
         <                                        <                                           <
    . -  1.       781      7.87               . -  2.     1313     13.24               . -  200.        6        .06
   1. -  2.       321      3.24              2. -  4.      139      1.40            200. -  400.       10        .10
   2. -  3.       422      4.25              4. -  6.      133      1.34            400. -  600.      494       4.98
   3. -  4.       415      4.18              6. -  8.      170      1.71            600. -  800.     1508      15.20
   4. -  5.       407      4.10              8. - 10.      209      2.11            800. - 1000.      395       3.98
   5. -  6.       288      2.90             10. - 12.      243      2.45           1000. - 1200.      763       7.69
   6. -  7.       268      2.70             12. - 14.      326      3.29           1200. - 1400.      690       6.96
   7. -  8.       283      2.85             14. - 16.      335      3.38           1400. - 1600.      999      10.07
   8. -  9.       248      2.50             16. - 18.      472      4.76           1600. - 1800.     1412      14.23
   9. - 10.       225      2.27             18. - 20.      453      4.57           1800. - 2000.     1181      11.91
  10. - 11.       274      2.76             20. - 22.      506      5.10           2000. - 2200.      758       7.64
  11. - 12.       234      2.36             22. - 24.      334      3.37           2200. - 2400.      386       3.89
  12. - 13.       275      2.77             24. - 26.      523      5.27           2400. - 2600.      603       6.08
  13. - 14.       242      2.44             26. - 28.      491      4.95           2600. - 2800.      310       3.12
  14. - 15.       232      2.34             28. - 30.      622      6.27           2800. - 3000.      377       3.80
  15. - 16.       162      1.63             30. - 32.      716      7.22           3000. - 3200.       23        .23
  16. - 17.       184      1.85             32. - 34.      564      5.69           3200. - 3400.        5        .05
  17. - 18.       153      1.54             34. - 36.      523      5.27           3400. - 3600.        0        .00
  18. - 19.       229      2.31             36. - 38.      512      5.16           3600. - 3800.        0        .00
  19. - 20.       980      9.88             38. - 40.      215      2.17           3800. - 4000.        0        .00
  20. - 21.      1050     10.58             40. - 42.      130      1.31           4000. - 4200.        0        .00
  21. - 22.       398      4.01             42. - 44.      101      1.02           4200. - 4400.        0        .00
  22. - 23.       282      2.84             44. - 46.      208      2.10           4400. - 4600.        0        .00
  23. - 24.       534      5.38             46. - 48.      225      2.27           4600. - 4800.        0        .00
  24. - 25.      1033     10.41             48. - 50.       90       .91           4800. - 5000.        0        .00
  25. - 26.         0       .00             50. - 52.      104      1.05
  26. - 27.         0       .00             52. - 54.      161      1.62
  27. - 28.         0       .00             54. - 56.       85       .86
  28. - 29.         0       .00             56. - 58.       16       .16
  29. - 30.         0       .00             58. - 60.        1       .01
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK 6-1
RUN DURATION 21.87 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 6

 VAR NO      MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM      RANGE
RPM   1   1432.8613   661.5712        6.2964  11040     3120.0000   255.0000   2865.0000
MV    2     14.8769     7.9492         .0757  11040       24.9750      .0000     24.9750
SPD   3     20.3292    14.8696         .1415  11040       57.2003      .0000     57.2003
TP    4      1.9937     2.5279         .0241  11040        9.9400      .0000      9.9400

                                PERCENT OF TIME               PERCENT OF TIME
                               THROTTLE POSITION AT          GEAR SHIFT POSITION AT
                               LEVEL        COUNT   PERCENT   GEAR    COUNT   PERCENT

                               CLOSED        5433     49.21      1        0       .00
                                  WOT         219      1.98      2      686     24.86
                                                                 3      368     13.33
                                                                 4     1680     60.87
                                                                 5        8       .29
                                                                 6        3       .11
                                                                 7       15       .54

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL             COUNT   PERCENT
          <                                   <                                      <
   . -  1.      765      6.93          . -  2.     2237     20.26             . -  200.      0       .00
  1. -  2.      509      4.61         2. -  4.      225      2.04          200. -  400.     15       .14
  2. -  3.      250      2.26         4. -  6.      152      1.38          400. -  600.    557      5.05
  3. -  4.      260      2.36         6. -  8.      190      1.72          600. -  800.   2339     21.19
  4. -  5.      230      2.08         8. - 10.      232      2.10          800. - 1000.    758      6.87
  5. -  6.      262      2.37        10. - 12.      264      2.39         1000. - 1200.    766      6.94
  6. -  7.      249      2.26        12. - 14.      334      3.03         1200. - 1400.    789      7.15
  7. -  8.      250      2.26        14. - 16.      524      4.75         1400. - 1600.   1141     10.34
  8. -  9.      189      1.71        16. - 18.      812      7.36         1600. - 1800.   1531     13.87
  9. - 10.      249      2.26        18. - 20.      595      5.39         1800. - 2000.   1283     11.62
 10. - 11.      259      2.35        20. - 22.      466      4.22         2000. - 2200.    437      3.96
 11. - 12.      258      2.34        22. - 24.      420      3.80         2200. - 2400.    238      2.16
 12. - 13.      269      2.44        24. - 26.      422      3.82         2400. - 2600.    219      1.98
 13. - 14.      316      2.86        26. - 28.      561      5.08         2600. - 2800.    706      6.39
 14. - 15.      332      3.01        28. - 30.      496      4.49         2800. - 3000.    251      2.27
 15. - 16.      292      2.64        30. - 32.      701      6.35         3000. - 3200.     10       .09
 16. - 17.      244      2.21        32. - 34.      599      5.43         3200. - 3400.      0       .00
 17. - 18.      202      1.83        34. - 36.      479      4.34         3400. - 3600.      0       .00
 18. - 19.      221      2.00        36. - 38.      288      2.61         3600. - 3800.      0       .00
 19. - 20.     1217     11.02        38. - 40.       45       .41         3800. - 4000.      0       .00
 20. - 21.     1760     15.94        40. - 42.       58       .53         4000. - 4200.      0       .00
 21. - 22.      387      3.51        42. - 44.       22       .20         4200. - 4400.      0       .00
 22. - 23.      465      4.21        44. - 46.       31       .28         4400. - 4600.      0       .00
 23. - 24.      563      5.10        46. - 48.      102       .92         4600. - 4800.      0       .00
 24. - 25.     1042      9.44        48. - 50.      392      3.55         4800. - 5000.      0       .00
 25. - 26.        0       .00        50. - 52.      191      1.73
 26. - 27.        0       .00        52. - 54.      139      1.26
 27. - 28.        0       .00        54. - 56.       58       .53
 28. - 29.        0       .00        56. - 58.        6       .05
 29. - 30.        0       .00        58. - 60.        0       .00
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 19.77 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 7

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM        RANGE
RPM   1    1534.0471     647.6215        6.4633  10040       3235.0000     315.0000    2920.0000
MV    2      14.4895       8.0886         .0807  10040         24.9750        .0000      24.9750
SPD   3      23.1209      15.0496         .1502  10040         60.7336        .0000      60.7336
TP    4       1.9925       2.4308         .0243  10040          9.9800        .0000       9.9800

                                   PERCENT OF TIME                    PERCENT OF TIME
                                   THROTTLE POSITION AT               GEAR SHIFT POSITION AT
                                   LEVEL        COUNT    PERCENT      GEAR    COUNT   PERCENT

                                   CLOSED        4528      45.10         1        7       .28
                                      WOT         118       1.18         2      612     24.38
                                                                         3      407     16.22
                                                                         4     1482     59.04
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        2       .08

PERCENT OF TIME  MV AT              PERCENT OF TIME  MS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL            COUNT   PERCENT
        <                                   <                                   <
   .  -  1.      718      7.15         .  -  2.     1442     14.36             .  -  200.      0       .00
  1.  -  2.      261      2.60        2.  -  4.      160      1.59          200.  -  400.      6       .06
  2.  -  3.      298      2.97        4.  -  6.      148      1.47          400.  -  600.    119      1.19
  3.  -  4.      397      3.95        6.  -  8.      159      1.58          600.  -  800.   1753     17.46
  4.  -  5.      258      2.57        8.  - 10.      204      2.03          800.  - 1000.    448      4.46
  5.  -  6.      238      2.37       10.  - 12.      381      3.79         1000.  - 1200.    780      7.77
  6.  -  7.      254      2.53       12.  - 14.      283      2.82         1200.  - 1400.   1013     10.09
  7.  -  8.      267      2.66       14.  - 16.      429      4.27         1400.  - 1600.   1483     14.77
  8.  -  9.      303      3.02       16.  - 18.      406      4.04         1600.  - 1800.   1624     16.18
  9.  - 10.      322      3.21       18.  - 20.      434      4.32         1800.  - 2000.    965      9.61
 10.  - 11.      288      2.87       20.  - 22.      402      4.00         2000.  - 2200.    430      4.28
 11.  - 12.      288      2.87       22.  - 24.      522      5.20         2200.  - 2400.    203      2.02
 12.  - 13.      215      2.14       24.  - 26.      565      5.63         2400.  - 2600.    299      2.98
 13.  - 14.      269      2.68       26.  - 28.      621      6.19         2600.  - 2800.    278      2.77
 14.  - 15.      202      2.01       28.  - 30.      685      6.82         2800.  - 3000.    388      3.86
 15.  - 16.      221      2.20       30.  - 32.      719      7.16         3000.  - 3200.    237      2.36
 16.  - 17.      205      2.04       32.  - 34.      630      6.27         3200.  - 3400.     14       .14
 17.  - 18.      334      3.33       34.  - 36.      397      3.95         3400.  - 3600.      0       .00
 18.  - 19.      299      2.98       36.  - 38.      219      2.18         3600.  - 3800.      0       .00
 19.  - 20.      324      3.23       38.  - 40.       71       .71         3800.  - 4000.      0       .00
 20.  - 21.     1572     15.66       40.  - 42.       30       .30         4000.  - 4200.      0       .00
 21.  - 22.      391      3.89       42.  - 44.       57       .57         4200.  - 4400.      0       .00
 22.  - 23.      265      2.64       44.  - 46.      145      1.44         4400.  - 4600.      0       .00
 23.  - 24.      569      5.67       46.  - 48.      129      1.28         4600.  - 4800.      0       .00
 24.  - 25.     1202     11.97       48.  - 50.      153      1.52         4800.  - 5000.      0       .00
 25.  - 26.        0       .00       50.  - 52.       94       .94
 26.  - 27.        0       .00       52.  - 54.      180      1.79
 27.  - 28.        0       .00       54.  - 56.      173      1.72
 28.  - 29.        0       .00       56.  - 58.      113      1.13
 29.  - 30.        0       .00       58.  - 60.       78       .78
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 21.83 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN F

 VAR NO        MEAN          S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM        RANGE
RPM   1     1462.0161     550.7120       5.1945  11240       3575.0000     250.0000    3325.0000
MV    2       14.3904       8.3204        .0785  11240         24.9750        .0000      24.9750
SPD   3       20.8274      12.3579        .1166  11240         51.8669        .0000      51.8669
TP    4        1.8488       2.2512        .0212  11240          9.9800        .0000       9.9800

                                       PERCENT OF TIME                  PERCENT OF TIME
                                      THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                      LEVEL          COUNT   PERCENT    GEAR     COUNT   PERCENT

                                      CLOSED          4988     44.38       1        0       .00
                                         WOT            78       .69       2      479     17.05
                                                                           3      569     20.25
                                                                           4     1759     62.60
                                                                           5        0       .00
                                                                           6        0       .00
                                                                           7        3       .11

 PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
 LEVEL            COUNT   PERCENT       LEVEL            COUNT   PERCENT        LEVEL            COUNT   PERCENT
          <                                      <                                       <
    . -  1.         930      8.27          . -  2.        1281     11.40             . -  200.        0        .00
   1. -  2.         288      2.56         2. -  4.         143      1.27         200. -  400.       13        .12
   2. -  3.         427      3.80         4. -  6.         184      1.64         400. -  600.      552       4.91
   3. -  4.         383      3.41         6. -  8.         208      1.85         600. -  800.     1313      11.68
   4. -  5.         303      2.70         8. - 10.         346      3.08         800. - 1000.      612       5.44
   5. -  6.         297      2.64        10. - 12.         411      3.66        1000. - 1200.     1078       9.59
   6. -  7.         369      3.28        12. - 14.         592      5.27        1200. - 1400.     1408      12.53
   7. -  8.         291      2.59        14. - 16.         772      6.87        1400. - 1600.     1588      14.13
   8. -  9.         244      2.17        16. - 18.         815      7.25        1600. - 1800.     1628      14.48
   9. - 10.         267      2.38        18. - 20.         686      6.10        1800. - 2000.     1148      10.21
  10. - 11.         291      2.59        20. - 22.         752      6.69        2000. - 2200.      686       6.10
  11. - 12.         257      2.29        22. - 24.         621      5.52        2200. - 2400.      693       6.17
  12. - 13.         228      2.03        24. - 26.         538      4.79        2400. - 2600.      337       3.00
  13. - 14.         229      2.04        26. - 28.         558      4.96        2600. - 2800.      129       1.15
  14. - 15.         248      2.21        28. - 30.         571      5.08        2800. - 3000.       41        .36
  15. - 16.         304      2.70        30. - 32.         586      5.21        3000. - 3200.        9        .08
  16. - 17.         271      2.41        32. - 34.         461      4.10        3200. - 3400.        3        .03
  17. - 18.         247      2.20        34. - 36.         353      3.14        3400. - 3600.        2        .02
  18. - 19.         334      2.97        36. - 38.         220      1.96        3600. - 3800.        0        .00
  19. - 20.         808      7.19        38. - 40.         292      2.60        3800. - 4000.        0        .00
  20. - 21.        1328     11.81        40. - 42.         301      2.68        4000. - 4200.        0        .00
  21. - 22.         365      3.25        42. - 44.         237      2.11        4200. - 4400.        0        .00
  22. - 23.         419      3.73        44. - 46.         153      1.36        4400. - 4600.        0        .00
  23. - 24.         722      6.42        46. - 48.          68       .60        4600. - 4800.        0        .00
  24. - 25.        1390     12.37        48. - 50.          55       .49        4800. - 5000.        0        .00
  25. - 26.           0       .00        50. - 52.          36       .32
  26. - 27.           0       .00        52. - 54.           0       .00
  27. - 28.           0       .00        54. - 56.           0       .00
  28. - 29.           0       .00        56. - 58.           0       .00
  29. - 30.           0       .00        58. - 60.           0       .00
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1967 FORD BOX VAN WITH 330 CID V8, 17000 LB GVW, TEST WT. 12400 LB. TRUCK G-1
RUN DURATION 21.66 MIN., IDLE SPEED 500 RPM, 7/19/74  RUN 9

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1442.4592    612.3793       5.8388  11000      2910.0000    145.0000   2765.0000
MV    2      14.2223      8.2712        .0789  11000        24.9750       .0000     24.9750
SPD   3      21.1611     14.2305        .1358  11000        56.6003       .0000     56.6003
TP    4       1.8062      2.3321        .0222  11000         9.9400       .0000      9.9400

                                  PERCENT OF TIME                PERCENT OF TIME
                                 THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT   GEAR    COUNT   PERCENT


                                 CLOSED        5300     48.18      1        0       .00
                                    WOT         156      1.42      2      649     23.60
                                                                   3      543     19.75
                                                                   4     1556     56.56
                                                                   5        0       .00
                                                                   6        0       .00
                                                                   7        2       .07

 PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT          LEVEL           COUNT   PERCENT
         <                                       <                                        <
     . -  1.      751      6.83              . -  2.     1840     16.73                . -  200.      1       .01
    1. -  2.      600      5.45             2. -  4.      180      1.64           200. -  400.      5       .05
    2. -  3.      498      4.53             4. -  6.      191      1.74           400. -  600.    702      6.38
    3. -  4.      327      2.97             6. -  8.      195      1.77           600. -  800.   1783     16.21
    4. -  5.      237      2.15             8. - 10.      219      1.99           800. - 1000.    565      5.14
    5. -  6.      247      2.25            10. - 12.      428      3.89          1000. - 1200.    818      7.44
    6. -  7.      320      2.91            12. - 14.      518      4.71          1200. - 1400.   1369     12.45
    7. -  8.      259      2.35            14. - 16.      454      4.13          1400. - 1600.   1256     11.42
    8. -  9.      246      2.24            16. - 18.      464      4.22          1600. - 1800.   1329     12.08
    9. - 10.      257      2.34            18. - 20.      558      5.07          1800. - 2000.   1146     10.42
   10. - 11.      251      2.28            20. - 22.      586      5.33          2000. - 2200.    614      5.58
   11. - 12.      264      2.40            22. - 24.      673      6.12          2200. - 2400.    421      3.83
   12. - 13.      211      1.92            24. - 26.      412      3.75          2400. - 2600.    580      5.27
   13. - 14.      193      1.75            26. - 28.      602      5.47          2600. - 2800.    333      3.03
   14. - 15.      216      1.96            28. - 30.      519      4.72          2800. - 3000.     78       .71
   15. - 16.      227      2.06            30. - 32.      537      4.88          3000. - 3200.      0       .00
   16. - 17.      227      2.06            32. - 34.      642      5.84          3200. - 3400.      0       .00
   17. - 18.      361      3.28            34. - 36.      299      2.72          3400. - 3600.      0       .00
   18. - 19.      411      3.74            36. - 38.      216      1.96          3600. - 3800.      0       .00
   19. - 20.      986      8.96            38. - 40.      222      2.02          3800. - 4000.      0       .00
   20. - 21.     1428     12.98            40. - 42.      195      1.77          4000. - 4200.      0       .00
   21. - 22.      357      3.25            42. - 44.      186      1.69          4200. - 4400.      0       .00
   22. - 23.      413      3.75            44. - 46.      326      2.96          4400. - 4600.      0       .00
   23. - 24.      676      6.15            46. - 48.      278      2.53          4600. - 4800.      0       .00
   24. - 25.     1037      9.43            48. - 50.      147      1.34          4800. - 5000.      0       .00
   25. - 26.        0       .00            50. - 52.       74       .67
   26. - 27.        0       .00            52. - 54.       30       .27
   27. - 28.        0       .00            54. - 56.        8       .07
   28. - 29.        0       .00            56. - 58.        1       .01
   29. - 30.        0       .00            58. - 60.        0       .00
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TRUCK G-2

1968 IHC 18200 LB GVW VAN
WITH 304 CID V8 ENGINE

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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 20,30 MIN., IDLE SPEED 500 RPM, 08/01/74 RUN 2

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGF
RPM  1     1400,8128     912,0710      36,9590     609      3200,0000      0.0000    3800,0000
MV   2       12,8142       8,5240        ,3454     609        24,7500       .4950      24,2550
SPD  3       21,5577      14,1386        ,5729     609        53,2513      0.0000      53,2513

   PERCENT OF TIME  MV AT              PERCENT OF TIME  MS AT               PERCENT OF TIME RPM AT
   LEVEL         COUNT   PERCENT        LEVEL        COUNT   PERCENT          LEVEL        COUNT   PERCENT
        <                                    <                                     <
   0 -   1         67     11,00          0 -   2       87     14,29             0 -  200     98     16,09
   1 -   2         61     10,02          2 -   4       23      3.78           200 -  400      5       ,82
   2 -   3         20      3,28          4 -   6        9      1.48           400 -  600     21      3,45
   3 -   4         12      1,97          6 -   8       17      2.79           600 -  800     63     10,34
   4 -   5         22      3,61          8 -  10       15      2.46           800 - 1000     21      3,45
   5 -   6         12      1,97         10 -  12       19      3,12          1000 - 1200     25      4,11
   6 -   7         19      3,12         12 -  14       15      2,46          1200 - 1400     44      7,22
   7 -   8          9      1,48         14 -  16       25      4.11          1400 - 1600     38      6,24
   8 -   9         14      2,30         16 -  18       21      3.45          1600 - 1800     87     14,29
   9 -  10         13      2,13         18 -  20       30      4,93          1800 - 2000     63     10,34
  10 -  11          3       ,49         20 -  22       24      3,94          2000 - 2200     36      5,91
  11 -  12         10      1,64         22 -  24       23      3,78          2200 - 2400     17      2,79
  12 -  13         10      1,64         24 -  26       32      5.25          2400 - 2600     15      2,46
  13 -  14         13      2,13         26 -  28       46      7.55          2600 - 2800     15      2,46
  14 -  15         23      3,78         28 -  30       66     10.84          2800 - 3000     31      5,09
  15 -  16         11      1,81         30 -  32       37      6.08          3000 - 3200     27      4,43
  16 -  17         12      1.97         32 -  34       45      7,39          3200 - 3400      3       ,49
  17 -  18         25      4,11         34 -  36       13      2.13          3400 - 3600      0      0.00
  18 -  19         77     12,64         36 -  38        2       .33          3600 - 3800      0      0,00
  19 -  20         31      5,09         38 -  40        1       .16          3800 - 4000      0      0,00
  20 -  21          9      1,48         40 -  42        2       .33          4000 - 4200      0      0,00
  21 -  22         16      2,63         42 -  44        4       .66          4200 - 4400      0      0,00
  22 -  23         25      4,11         44 -  46        5       ,82          4400 - 4600      0      0,00
  23 -  24         83     13,63         46 -  48        9      1.48          4600 - 4800      0      0,00
  24 -  25         12      1,97         48 -  50       24      3,94          4800 - 5000      0      0,00
  25 -  26          0      0,00         50 -  52       12      1,97
  26 -  27          0      0,00         52 -  54        3       ,49
  27 -  28          0      0,00         54 -  56        0      0,00
  28 -  29          0      0.00         56 -  58        0      0,00
  29 -  30          0      0,00         58 -  60        0      0.00
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 25.38 MIN., IDLE SPEED 500 RPM, 8/1/74 RUN 4

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM   1    1571.2571    655.3113       5.8013  12760      3300.0000     365.0000   2935.0000
MV    2      12.1813      7.5727        .0670  12760        22.5300        .2100     22.3200
SPD   3      17.7979     13.6302        .1207  12760        52.5498        .0000     52.5498
TP    4       2.5345      2.1456        .0190  12760         8.6600        .7900      7.8700

                                       PERCENT OF TIME                 PERCENT OF TIME
                                      THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                      LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT

                                      CLOSED        5999     47.01       1        0       .00
                                         WOT         331      2.59       2      967     30.31
                                                                         3      562     17.62
                                                                         4     1661     52.07
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        0       .00

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL           COUNT   PERCENT          LEVEL         COUNT   PERCENT             LEVEL           COUNT   PERCENT
        <                                        <                                          <
    . -  1.       1464     11.47              . -  2.    2725     21.36                 . -  200.        0       .00
   1. -  2.        879      6.89             2. -  4.     421      3.30              200. -  400.        1       .01
   2. -  3.        452      3.54             4. -  6.     383      3.00              400. -  600.       77       .60
   3. -  4.        386      3.03             6. -  8.     295      2.31              600. -  800.     2062     16.16
   4. -  5.        456      3.57             8. - 10.     361      2.83              800. - 1000.     1318     10.33
   5. -  6.        270      2.12            10. - 12.     467      3.66             1000. - 1200.      767      6.01
   6. -  7.        277      2.17            12. - 14.     563      4.41             1200. - 1400.      823      6.45
   7. -  8.        217      1.70            14. - 16.     668      5.24             1400. - 1600.     1506     11.80
   8. -  9.        231      1.81            16. - 18.     544      4.26             1600. - 1800.     1848     14.48
   9. - 10.        215      1.68            18. - 20.     533      4.18             1800. - 2000.     1576     12.35
  10. - 11.        175      1.37            20. - 22.     448      3.51             2000. - 2200.      728      5.71
  11. - 12.        221      1.73            22. - 24.     703      5.51             2200. - 2400.      422      3.31
  12. - 13.        284      2.23            24. - 26.     747      5.85             2400. - 2600.      476      3.73
  13. - 14.        305      2.39            26. - 28.     979      7.67             2600. - 2800.      370      2.90
  14. - 15.        268      2.10            28. - 30.     832      6.52             2800. - 3000.      458      3.59
  15. - 16.        393      3.08            30. - 32.     505      3.96             3000. - 3200.      312      2.45
  16. - 17.       1287     10.09            32. - 34.     244      1.91             3200. - 3400.       16       .13
  17. - 18.       1895     14.85            34. - 36.      86       .67             3400. - 3600.        0       .00
  18. - 19.        417      3.27            36. - 38.      90       .71             3600. - 3800.        0       .00
  19. - 20.        414      3.24            38. - 40.     221      1.73             3800. - 4000.        0       .00
  20. - 21.        943      7.39            40. - 42.     169      1.32             4000. - 4200.        0       .00
  21. - 22.       1157      9.07            42. - 44.     165      1.29             4200. - 4400.        0       .00
  22. - 23.        154      1.21            44. - 46.     200      1.57             4400. - 4600.        0       .00
  23. - 24.          0       .00            46. - 48.     259      2.03             4600. - 4800.        0       .00
  24. - 25.          0       .00            48. - 50.     129      1.01             4800. - 5000.        0       .00
  25. - 26.          0       .00            50. - 52.      21       .16
  26. - 27.          0       .00            52. - 54.       2       .02
  27. - 28.          0       .00            54. - 56.       0       .00
  28. - 29.          0       .00            56. - 58.       0       .00
  29. - 30.          0       .00            58. - 60.       0       .00
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 20.96 MIN., IDLE SPEED 500 RPM, 8/1/74 RUN 5

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM        RANGE
RPM   1     1818.1487     724.5835        6.9594   10840       3470.0000     435.0000    3035.0000
MV    2       11.9204       7.4977         .0720   10840         22.3800        .1800      22.2000
SPD   3       21.5908      14.8712         .1428   10840         56.3762        .0000      56.3762
TP    4        2.7862       2.2415         .0215   10840          8.6700        .8000       7.8700

                                    PERCENT OF TIME                  PERCENT OF TIME
                                   THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT   GEAR    COUNT   PERCENT


                                   CLOSED         4329     39.94      1        0       .00
                                      WOT          558      5.15      2      608     22.44
                                                                      3      621     22.92
                                                                      4     1480     54.61
                                                                      5        0       .00
                                                                      6        0       .00
                                                                      7        1       .04

PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT        LEVEL           COUNT   PERCENT         LEVEL              COUNT   PERCENT
          <                                      <                                         <
     . -  1.     1248     11.51             . -  2.     1934     17.84               . -  200.       0       .00
    1. -  2.      731      6.74            2. -  4.      188      1.73            200. -  400.       0       .00
    2. -  3.      434      4.00            4. -  6.      223      2.06            400. -  600.       5       .05
    3. -  4.      391      3.61            6. -  8.      169      1.56            600. -  800.    1098     10.13
    4. -  5.      252      2.32            8. - 10.      202      1.86            800. - 1000.    1175     10.84
    5. -  6.      225      2.08           10. - 12.      248      2.29           1000. - 1200.     384      3.54
    6. -  7.      304      2.80           12. - 14.      368      3.39           1200. - 1400.     462      4.26
    7. -  8.      199      1.84           14. - 16.      449      4.14           1400. - 1600.     900      8.30
    8. -  9.      205      1.89           16. - 18.      626      5.77           1600. - 1800.    1084     10.00
    9. - 10.      205      1.89           18. - 20.      435      4.01           1800. - 2000.    1218     11.24
   10. - 11.      194      1.79           20. - 22.      613      5.65           2000. - 2200.    1257     11.60
   11. - 12.      249      2.30           22. - 24.      544      5.02           2200. - 2400.    1186     10.94
   12. - 13.      298      2.75           24. - 26.      672      6.20           2400. - 2600.     556      5.13
   13. - 14.      423      3.90           26. - 28.      371      3.42           2600. - 2800.     274      2.53
   14. - 15.      375      3.46           28. - 30.      408      3.76           2800. - 3000.     386      3.56
   15. - 16.      338      3.12           30. - 32.      485      4.47           3000. - 3200.     441      4.07
   16. - 17.      688      6.35           32. - 34.      576      5.31           3200. - 3400.     386      3.56
   17. - 18.     1604     14.80           34. - 36.      650      6.00           3400. - 3600.      28       .26
   18. - 19.      395      3.64           36. - 38.      301      2.78           3600. - 3800.       0       .00
   19. - 20.      267      2.46           38. - 40.      208      1.92           3800. - 4000.       0       .00
   20. - 21.      546      5.04           40. - 42.       99       .91           4000. - 4200.       0       .00
   21. - 22.     1194     11.01           42. - 44.       61       .56           4200. - 4400.       0       .00
   22. - 23.       75       .69           44. - 46.      209      1.93           4400. - 4600.       0       .00
   23. - 24.        0       .00           46. - 48.      204      1.88           4600. - 4800.       0       .00
   24. - 25.        0       .00           48. - 50.      260      2.40           4800. - 5000.       0       .00
   25. - 26.        0       .00           50. - 52.      217      2.00
   26. - 27.        0       .00           52. - 54.      108      1.00
   27. - 28.        0       .00           54. - 56.       10       .09
   28. - 29.        0       .00           56. - 58.        2       .02
   29. - 30.        0       .00           58. - 60.        0       .00
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 22.78 MIN., IDLE SPEED 500 RPM, 8/1/74 RUN 6

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM     MINIMUM       RANGE
RPM   1    1734.6934    794.6046       7.3026  11840       3865.0000    425.0000   3440.0000
MV    2      11.6351      7.8497        .0721  11840         25.6800       .1800     25.5000
SPD   3      19.7740     15.3374        .1410  11840         62.3710       .0000     62.3710
TP    4       2.8004      2.2774        .0209  11840          8.6400       .1900      8.4500

                                   PERCENT OF TIME               PERCENT OF TIME
                                  THROTTLE POSITION AT          GEAR SHIFT POSITION AT
                                  LEVEL        COUNT   PERCENT   GEAR    COUNT   PERCENT


                                  CLOSED        5267     44.48      1        0       .00
                                     WOT         203      1.71      2      776     26.22
                                                                    3      777     26.25
                                                                    4     1406     47.50
                                                                    5        0       .00
                                                                    6        0       .00
                                                                    7        1       .03

 PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT                   PERCENT OF TIME RPM AT
 LEVEL         COUNT   PERCENT         LEVEL         COUNT   PERCENT            LEVEL            COUNT   PERCENT
        <                                     <                                        <
   . -  1.      1553     13.12            . -  2.     2480     20.95                . -  200.       0       .00
  1. -  2.      1102      9.31           2. -  4.      282      2.38             200. -  400.       0       .00
  2. -  3.       508      4.29           4. -  6.      261      2.20             400. -  600.      16       .14
  3. -  4.       363      3.07           6. -  8.      287      2.42             600. -  800.    1389     11.73
  4. -  5.       235      1.98           8. - 10.      335      2.83             800. - 1000.    1605     13.56
  5. -  6.       286      2.42          10. - 12.      332      2.80            1000. - 1200.     545      4.60
  6. -  7.       249      2.10          12. - 14.      392      3.31            1200. - 1400.     913      7.71
  7. -  8.       247      2.09          14. - 16.      320      2.70            1400. - 1600.     761      6.43
  8. -  9.       254      2.15          16. - 18.      531      4.48            1600. - 1800.    1211     10.23
  9. - 10.       193      1.63          18. - 20.      641      5.41            1800. - 2000.    1479     12.49
 10. - 11.       154      1.30          20. - 22.      723      6.11            2000. - 2200.    1300     10.98
 11. - 12.       166      1.40          22. - 24.      485      4.10            2200. - 2400.     748      6.32
 12. - 13.       144      1.22          24. - 26.      518      4.37            2400. - 2600.     295      2.49
 13. - 14.       161      1.36          26. - 28.      786      6.64            2600. - 2800.     232      1.96
 14. - 15.       216      1.82          28. - 30.      853      7.20            2800. - 3000.     185      1.56
 15. - 16.       272      2.30          30. - 32.      517      4.37            3000. - 3200.     186      1.57
 16. - 17.       931      7.86          32. - 34.      622      5.25            3200. - 340       353      2.98
 17. - 18.      2076     17.53          34. - 36.      392      3.31            3400. - 3600.     348      2.94
 18. - 19.       443      3.74          36. - 38.       68       .57            3600. - 3800.     237      2.00
 19. - 20.       399      3.37          38. - 40.       25       .21            3800. - 4000.      37       .31
 20. - 21.       589      4.97          40. - 42.       19       .16            4000. - 4200.       0       .00
 21. - 22.      1245     10.52          42. - 44.       21       .18            4200. - 4400.       0       .00
 22. - 23.        53       .45          44. - 46.       34       .29            4400. - 4600.       0       .00
 23. - 24.         0       .00          46. - 48.       49       .41            4600. - 4800.       0       .00
 24. - 25.         0       .00          48. - 50.       43       .36            4800. - 5000.       0       .00
 25. - 26.         1       .01          50. - 52.      150      1.27
 26. - 27.         0       .00          52. - 54.      227      1.92
 27. - 28.         0       .00          54. - 56.      186      1.57
 28. - 29.         0       .00          56. - 58.      151      1.28
 29. - 30.         0       .00          58. - 60.       77       .65
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 23.76 MIN., IDLE SPEED 500 RPM, 08/01/74 RUN 7

 VAR NO       MEAN        S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM      RANGE
RPM  1     1390.2199    785.0266      29.5658     705        3975.0000     0.0000    3975.0000
MV   2       13.2073      7.9220        .2984     705          24.4200      .1650      24.2550
SPD  3       18.2057     13.6196        .5128     705          49.7437     0.0000      49.7437

   PERCENT OF TIME  MV AT                  PERCENT OF TIME  MS AT                   PERCENT OF TIME RPM AT
   LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT            LEVEL           COUNT   PERCENT
        <                                        <                                         <
    0 -   1          65      9.22            0 -   2         138     19.57              0 -   200        34      4.82
    1 -   2          41      5.82            2 -   4          12      1.70            200 -   400        19      2.70
    2 -   3          20      2.84            4 -   6          24      3.40            400 -   600       107     15.18
    3 -   4          24      3.40            6 -   8          27      3.83            600 -   800        53      7.52
    4 -   5          23      3.26            8 -  10          18      2.55            800 -  1000        39      5.53
    5 -   6          18      2.55           10 -  12          24      3.40           1000 -  1200        56      7.94
    6 -   7          23      3.26           12 -  14          31      4.40           1200 -  1400        58      8.23
    7 -   8          12      1.70           14 -  16          48      6.81           1400 -  1600        70      9.93
    8 -   9          24      3.40           16 -  18          31      4.40           1600 -  1800        89     12.62
    9 -  10          21      2.98           18 -  20          28      3.97           1800 -  2000        49      6.95
   10 -  11          13      1.84           20 -  22          27      3.83           2000 -  2200        24      3.40
   11 -  12           8      1.13           22 -  24          31      4.40           2200 -  2400        16      2.27
   12 -  13           9      1.28           24 -  26          45      6.38           2400 -  2600        23      3.26
   13 -  14          17      2.41           26 -  28          49      6.95           2600 -  2800        38      5.39
   14 -  15           8      1.13           28 -  30          69      9.79           2800 -  3000        20      2.84
   15 -  16          10      1.42           30 -  32          35      4.96           3000 -  3200         5       .71
   16 -  17          16      2.27           32 -  34           2       .28           3200 -  3400         3       .43
   17 -  18          26      3.69           34 -  36           0      0.00           3400 -  3600         1       .14
   18 -  19         111     15.74           36 -  38           2       .28           3600 -  3800         0      0.00
   19 -  20          85     12.06           38 -  40           2       .28           3800 -  4000         1       .14
   20 -  21          20      2.84           40 -  42           5       .71           4000 -  4200         0      0.00
   21 -  22          20      2.84           42 -  44           8      1.13           4200 -  4400         0      0.00
   22 -  23          36      5.11           44 -  46          15      2.13           4400 -  4600         0      0.00
   23 -  24          50      7.09           46 -  48          20      2.84           4600 -  4800         0      0.00
   24 -  25           5       .71           48 -  50          14      1.99           4800 -  5000         0      0.00
   25 -  26           0      0.00           50 -  52           0      0.00
   26 -  27           0      0.00           52 -  54           0      0.00
   27 -  28           0      0.00           54 -  56           0      0.00
   28 -  29           0      0.00           56 -  58           0      0.00
   29 -  30           0      0.00           58 -  60           0      0.00
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 21.82 MIN., IDLE SPEED 500 RPM, 8/1/74 RUN 8

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM    1   1707.2471    694.9160        6.5546  11240       4275.0000        .0000   4275.0000
MV     2     11.7860      7.9171         .0747  11240         22.3800        .0600     22.3200
SPD    3     20.7685     12.9323         .1220  11240         56.8864        .0000     56.8864
TP     4      2.7390      2.0524         .0194  11240          7.4900        .8000      6.6900

                                      PERCENT OF TIME              PERCENT OF TIME
                                     THROTTLE POSITION AT          GEAR SHIFT POSITION AT
                                     LEVEL       COUNT   PERCENT   GEAR    COUNT   PERCENT


                                     CLOSED       4658     41.44     1         0       .00
                                        WOT          0       .00     2       637     22.67
                                                                     3       748     26.62
                                                                     4      1425     50.71
                                                                     5         0       .00
                                                                     6         0       .00
                                                                     7         0       .00

 PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT          LEVEL           COUNT   PERCENT
        <                                      <                                       <
   . -  1.       1672     14.88           . -  2.      1523     13.55              . -  200.       4       .04
  1. -  2.        830      7.38          2. -  4.       137      1.22           200. -  400.       0       .00
  2. -  3.        457      4.07          4. -  6.       141      1.25           400. -  600.       4       .04
  3. -  4.        328      2.92          6. -  8.       169      1.50           600. -  800.     320      2.85
  4. -  5.        285      2.54          8. - 10.       235      2.09           800. - 1000.    1771     15.76
  5. -  6.        252      2.24         10. - 12.       451      4.01          1000. - 1200.     387      3.44
  6. -  7.        150      1.33         12. - 14.       493      4.39          1200. - 1400.     690      6.14
  7. -  8.        202      1.80         14. - 16.       596      5.30          1400. - 1600.    1339     11.91
  8. -  9.        179      1.59         16. - 18.       805      7.16          1600. - 1600.    1638     14.57
  9. - 10.        154      1.37         18. - 20.       805      7.16          1800. - 2000.    1413     12.57
 10. - 11.        197      1.75         20. - 22.       482      4.29          2000. - 2200.    1147     10.20
 11. - 12.        253      2.25         22.   24.       867      7.71          2200. - 2400.     534      4.75
 12. - 13.        267      2.38         24. - 26.       775      6.90          2400. - 2600.     394      3.51
 13. - 14.        221      1.97         26. - 28.       958      8.52          2600. - 2800.     355      3.16
 14. - 15.        277      2.46         28. - 30.       560      4.98          2800. - 3000.     294      2.62
 15. - 16.        204      1.81         30. - 32.       427      3.80          3000. - 3200.     514      4.57
 16. - 17.        455      4.05         32. - 34.       464      4.13          3200. - 3400.     347      3.09
 17. - 18.       1758     15.64         34. - 36.       207      1.84          3400. - 3600.      30       .27
 18. - 19.        572      5.09         36. - 38.       105       .93          3600. - 3800.      23       .20
 19. - 20.        454      4.04         38. - 40.        75       .67          3800. - 4000.      22       .20
 20. - 21.        819      7.29         40. - 42.        91       .81          4000. - 4200.      10       .09
 21. - 22.       1163     10.35         42. - 44.       115      1.02          4200. - 4400.       4       .04
 22. - 23.         91       .81         44. - 46.       116      1.03          4400. - 4600.       0       .00
 23. - 24.          0       .00         46. - 48.       210      1.87          4600. - 4800.       0       .00
 24. - 25.          0       .00         48. - 50.       237      2.11          4800. - 5000.       0       .00
 25. - 26.          0       .00         50. - 52.       150      1.33
 26. - 27.          0       .00         52. - 54.        38       .34
 27. - 28.          0       .00         54. - 56.         6       .05
 28. - 29.          0       .00         56. - 58.         2       .02
 29. - 30.          0       .00         58. - 60.         0       .00
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1968 IHC BOX VAN WITH 304 CID V8, 18200 LB. GVW, TEST WT. 14885 LB. TRUCK G-2
RUN DURATION 21.69 MIN., IDLE SPEED 500 RPM, 8/1/74 RUN 9

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1     1801.4150     739.7252       6.9773   11240      4260.0000     340.0000    3920.0000
MV    2       11.7007       7.5414        .0711   11240        22.4100        .0000      22.4100
SPD   3       20.7927      13.1618        .1241   11240        56.8226        .0000      56.8226
TP    4        2.5749       1.7589        .0166   11240         6.8900        .7600       6.1300

                                  PERCENT OF TIME                 PERCENT OF TIME
                                  THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                  LEVEL       COUNT   PERCENT     GEAR    COUNT   PERCENT

                                  CLOSED       4490     39.95        1        0       .00
                                     WOT          0       .00        2      548     19.50
                                                                     3      753     26.80
                                                                     4     1508     53.67
                                                                     5        0       .00
                                                                     6        0       .00
                                                                     7        1       .04

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
LEVEL        COUNT   PERCENT        LEVEL        COUNT   PERCENT        LEVEL          COUNT   PERCENT
     <                                   <                                      <
  . -  1.     1051      9.35          . -  2.     1527     13.59             . -  200.      0       .00
 1. -  2.      803      7.14         2. -  4.      167      1.49         200. -  400.      2       .02
 2. -  3.      612      5.44         4. -  6.      172      1.53         400. -  600.     10       .09
 3. -  4.      468      4.16         6. -  8.      205      1.82         600. -  800.    243      2.16
 4. -  5.      418      3.72         8. - 10.      179      1.59         800. - 1000.   1998     17.78
 5. -  6.      330      2.94        10. - 12.      312      2.78        1000. - 1200.    447      3.98
 6. -  7.      281      2.50        12. - 14.      595      5.29        1200. - 1400.   1004      8.93
 7. -  8.      288      2.56        14. - 16.      590      5.25        1400. - 1600.    932      8.29
 8. -  9.      276      2.46        16. - 18.      659      5.86        1600. - 1800.   1395     12.41
 9. - 10.      294      2.62        18. - 20.      853      7.59        1800. - 2000.   1448     12.88
10. - 11.      234      2.08        20. - 22.      877      7.80        2000. - 2200.    963      8.57
11. - 12.      179      1.59        22. - 24.      581      5.17        2200. - 2400.    570      5.07
12. - 13.      221      1.97        24. - 26.      735      6.54        2400. - 2600.    352      3.13
13. - 14.      220      1.96        26. - 28.      864      7.69        2600. - 2800.    439      3.91
14. - 15.      231      2.06        28. - 30.      837      7.45        2800. - 3000.    365      3.25
15. - 16.      205      1.82        30. - 32.      607      5.40        3000. - 3200.    295      2.62
16. - 17.      396      3.52        32. - 34.      186      1.65        3200. - 3400.    573      5.10
17. - 18.     1869     16.63        34. - 36.      144      1.28        3400. - 3600.    164      1.46
18. - 19.      612      5.44        36. - 38.       50       .44        3600. - 3800.     14       .12
19. - 20.      531      4.72        38. - 40.       51       .45        3800. - 4000.     10       .09
20. - 21.      730      6.49        40. - 42.      123      1.09        4000. - 4200.     11       .10
21. - 22.      948      8.43        42. - 44.      130      1.16        4200. - 4400.      5       .04
22. - 23.       43       .38        44. - 46.       84       .75        4400. - 4600.      0       .00
23. - 24.        0       .00        46. - 48.      109       .97        4600. - 4800.      0       .00
24. - 25.        0       .00        48. - 50.      253      2.25        4800. - 5000.      0       .00
25. - 26.        0       .00        50. - 52.      203      1.81
26. - 27.        0       .00        52. - 54.       95       .85
27. - 28.        0       .00        54. - 56.       48       .43
28. - 29.        0       .00        56. - 58.        4       .04
29. - 30.        0       .00        58. - 60.        0       .00
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TRUCK G-3

1967 FORD 10000 LB GVW VAN WITH 300 CID I6 ENGINE

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1967 FORD BOX VAN WITH 300 CID I6, 10000 LB. GVW, TEST WT. 9140 LB. TRUCK G-3
RUN DURATION 20.04 MIN., IDLE SPEED 500 RPM,  8/12/74 RUN 1

 VAR NO      MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM      RANGE
RPM   1   1454.2917   728.2393      7.4953     9440     3255.0000    440.0000   2815.0000
MV    2     14.3105     5.9428       .0612     9440       24.8100      1.1700     23.6400
SPD   3     22.1581    15.8382       .1630     9440       57.4695       .0000     57.4695
TP    4      4.4240     1.2513       .0129     9440        8.3000      2.9300      5.3700

                                 PERCENT OF TIME                   PERCENT OF TIME
                                 THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                 LEVEL         COUNT   PERCENT     GEAR    COUNT   PERCENT


                                 CLOSED         3829     40.56        1      679     28.77
                                    WOT          116      1.23        2      270     11.44
                                                                      3     1410     59.75
                                                                      4        1       .04
                                                                      5        0       .00
                                                                      6        0       .00
                                                                      7        0       .00

PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT      LEVEL              COUNT   PERCENT
      <                                     <                                   <
  . -  1.          0       .00          . -  2.       1870     19.81          . -  200.        0       .00
 1. -  2.        130      1.38         2. -  4.        244      2.58       200. -  400.        0       .00
 2. -  3.        214      2.27         4. -  6.        223      2.36       400. -  600.     1902     20.15
 3. -  4.        351      3.72         6. -  8.        240      2.54       600. -  800.      626      6.63
 4. -  5.        262      2.78         8. - 10.        210      2.22       800. - 1000.      473      5.01
 5. -  6.        234      2.48        10. - 12.        191      2.02      1000. - 1200.      595      6.30
 6. -  7.        297      3.15        12. - 14.        192      2.03      1200. - 1400.      717      7.60
 7. -  8.        335      3.55        14. - 16.        176      1.86      1400. - 1600.      985     10.43
 8. -  9.        259      2.74        16. - 18.        277      2.93      1600. - 1800.     1231     13.04
 9. - 10.        247      2.62        18. - 20.        303      3.21      1800. - 2000.     1315     13.93
10. - 11.        282      2.99        20. - 22.        302      3.20      2000. - 2200.      348      3.69
11. - 12.        263      2.79        22. - 24.        343      3.63      2200. - 2400.       75       .79
12. - 13.        241      2.55        24. - 26.        455      4.82      2400. - 2600.       85       .90
13. - 14.        285      3.02        26. - 28.        544      5.76      2600. - 2800.      343      3.63
14. - 15.       1166     12.35        28. - 30.        437      4.63      2800. - 3000.      663      7.02
15. - 16.       1334     14.13        30. - 32.        637      6.75      3000. - 3200.       72       .76
16. - 17.        532      5.64        32. - 34.        885      9.37      3200. - 3400.       10       .11
17. - 18.        325      3.44        34. - 36.        557      5.90      3400. - 3600.        0       .00
18. - 19.        332      3.52        36. - 38.        181      1.92      3600. - 3800.        0       .00
19. - 20.        475      5.03        38. - 40.         49       .52      3800. - 4000.        0       .00
20. - 21.        358      3.79        40. - 42.         29       .31      4000. - 4200.        0       .00
21. - 22.        598      6.33        42. - 44.         40       .42      4200. - 4400.        0       .00
22. - 23.        475      5.03        44. - 46.         38       .40      4400. - 4600.        0       .00
23. - 24.        342      3.62        46. - 48.        176      1.86      4600. - 4800.        0       .00
24. - 25.        103      1.09        48. - 50.        341      3.61      4800. - 5000.        0       .00
25. - 26.          0       .00        50. - 52.        331      3.51
26. - 27.          0       .00        52. - 54.        137      1.45
27. - 28.          0       .00        54. - 56.         28       .30
28. - 29.          0       .00        56. - 58.          4       .04
29. - 30.          0       .00        58. - 60.          0       .00
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1967 FORD BOX VAN WITH 300 CID I6, 10000 LB. GVW, TEST WT. 9140 LB. TRUCK G-3
RUN DURATION 19.48 MIN., IDLE SPEED 500 RPM, 8/12/74 RUN 2

 VAR NO        MEAN          S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM       MINIMUM        RANGE
RPM   1     1590.4717     739.7827        7.3538   10120       4920.0000         .0000    4920.0000
MV    2       14.2520       6.3736         .0634   10120         24.9000        1.0800      23.8200
SPD   3       22.6199      13.6360         .1355   10120         52.6693         .0667      52.6026
TP    4        4.4995       1.2664         .0126   10120          8.3200        3.0500       5.2700

                                    PERCENT OF TIME                   PERCENT OF TIME
                                   THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT     GEAR    COUNT   PERCENT


                                   CLOSED         3943     38.96        1      419     16.56
                                      WOT           56       .55        2      421     16.64
                                                                        3      727     28.74
                                                                        4      920     36.36
                                                                        5        0       .00
                                                                        6        0       .00
                                                                        7       35      1.38

 PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT            LEVEL           COUNT   PERCENT
         <                                        <                                          <
    . -  1.         0       .00             . -  2.      1236     12.21                . -  200.       9       .09
   1. -  2.       122      1.21            2. -  4.       189      1.87             200. -  400.       2       .02
   2. -  3.       308      3.04            4. -  6.       215      2.12             400. -  600.    1003      9.91
   3. -  4.       508      5.02            6. -  8.       277      2.74             600. -  800.     980      9.68
   4. -  5.       391      3.86            8. - 10.       230      2.27             800. - 1000.     541      5.35
   5. -  6.       309      3.05           10. - 12.       323      3.19            1000. - 1200.     729      7.20
   6. -  7.       293      2.90           12. - 14.       420      4.15            1200. - 1400.     703      6.95
   7. -  8.       226      2.23           14. - 16.       397      3.92            1400. - 1600.     945      9.34
   8. -  9.       270      2.67           16. - 18.       506      5.00            1600. - 1800.    1113     11.00
   9. - 10.       256      2.53           18. - 20.       387      3.82            1800. - 2000.    1412     13.95
  10. - 11.       400      3.95           20. - 22.       441      4.36            2000. - 2200.     880      8.70
  11. - 12.       241      2.38           22. - 24.       487      4.81            2200. - 2400.     518      5.12
  12. - 13.       270      2.67           24. - 26.       347      3.43            2400. - 2600.     516      5.10
  13. - 14.       319      3.15           26. - 28.       454      4.49            2600. - 2800.     389      3.84
  14. - 15.       897      8.86           28. - 30.       620      6.13            2800. - 3000.     191      1.89
  15. - 16.      1176     11.62           30. - 32.       750      7.41            3000. - 3200.      22       .22
  16. - 17.       571      5.64           32. - 34.       788      7.79            3200. - 3400.      12       .12
  17. - 18.       489      4.83           34. - 36.       529      5.23            3400. - 3600.      10       .10
  18. - 19.       437      4.32           36. - 38.       266      2.63            3600. - 3800.       9       .09
  19. - 20.       338      3.34           38. - 40.       169      1.67            3800. - 4000.      12       .12
  20. - 21.       508      5.02           40. - 42.       203      2.01            4000. - 4200.      11       .11
  21. - 22.       583      5.76           42. - 44.       262      2.59            4200. - 4400.      41       .41
  22. - 23.       405      4.00           44. - 46.       297      2.93            4400. - 4600.      33       .33
  23. - 24.       486      4.80           46. - 48.       179      1.77            4600. - 4800.      26       .26
  24. - 25.       317      3.13           48. - 50.       120      1.19            4800. - 5000.      13       .13
  25. - 26.         0       .00           50. - 52.        25       .25
  26. - 27.         0       .00           52. - 54.         3       .03
  27. - 28.         0       .00           54. - 56.         0       .00
  28. - 29.         0       .00           56. - 58.         0       .00
  29. - 30.         0       .00           58. - 60.         0       .00
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1967 FORD BOX VAN WITH 300 CID I6. 10000 LB. GVW. TEST WT. 9140 LB. TRUCK G-3
RUN DURATION 22.62 MIN., IDLE SPEED 500 RPM.  8/12/74 RUN 3

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM       RANGE
RPM   1   1325.1973    669.3701       6.1207   11960      3110.0000    435.0000   2675.0000
MV    2     14.4416      5.9194        .0541   11960        25.3200      1.3200     24.0000
SPD   3     18.8728     15.0562        .1377   11960        57.4695       .0000     57.4695
TP    4      4.3389      1.2317        .0113   11960         8.2200      3.0800      5.1400

                                PERCENT OF TIME               PERCENT OF TIME
                               THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                               LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT

                               CLOSED        5428     45.38      1      1382     46.22
                                  WOT          19       .16      2       391     13.08
                                                                 3      1217     40.70
                                                                 4         0       .00
                                                                 5         0       .00
                                                                 6         0       .00
                                                                 7         0       .00

 PERCENT OF TIME  MV AT            PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
 LEVEL         COUNT   PERCENT     LEVEL         COUNT   PERCENT      LEVEL           COUNT   PERCENT
        <                                 <                                   <
    . -  1.        0       .00         . -  2.    2613     21.85          . -  200.       0       .00
   1. -  2.       58       .48        2. -  4.     425      3.55       200. -  400.       0       .00
   2. -  3.      326      2.73        4. -  6.     412      3.44       400. -  600.    2596     21.71
   3. -  4.      533      4.46        6. -  8.     373      3.12       600. -  800.    1282     10.72
   4. -  5.      353      2.95        8. - 10.     390      3.26       800. - 1000.     537      4.49
   5. -  6.      254      2.12       10. - 12.     473      3.95      1000. - 1200.     722      6.04
   6. -  7.      300      2.51       12. - 14.     431      3.60      1200. - 1400.    1278     10.69
   7. -  8.      357      2.98       14. - 16.     312      2.61      1400. - 1600.    1503     12.57
   8. -  9.      312      2.61       16. - 18      297      2.48      1600. - 1800.    1545     12.92
   9. - 10.      338      2.83       18. - 20.     285      2.38      1800. - 2000.     966      8.08
  10. - 11.      327      2.73       20. - 22.     358      2.99      2000. - 2200.     327      2.73
  11. - 12.      309      2.58       22. - 24.     423      3.54      2200. - 2400.     157      1.31
  12. - 13.      336      2.81       24. - 26.     698      5.84      2400. - 2600.     112       .94
  13. - 14.      370      3.09       26. - 28.    1113      9.31      2600. - 2800.     549      4.59
  14. - 15.     1152      9.63       28. - 30.     840      7.02      2800. - 3000.     311      2.60
  15. - 16.     2137     17.87       30. - 32.     532      4.45      3000. - 3200.      75       .63
  16. - 17.      853      7.13       32. - 34.     456      3.81      3200. - 3400.       0       .00
  17. - 18.      554      4.63       34. - 36.     307      2.57      3400. - 3600.       0       .00
  18. - 19.      433      3.62       36. - 38.      79       .66      3600. - 3800.       0       .00
  19. - 20.      339      2.83       38. - 40.      61       .51      3800. - 4000.       0       .00
  20. - 21.      336      2.81       40. - 42.      38       .32      4000. - 4200.       0       .00
  21. - 22.      427      3.57       42. - 44.      36       .30      4200. - 4400.       0       .00
  22. - 23.      842      7.04       44. - 46.      61       .51      4400. - 4600.       0       .00
  23. - 24.      431      3.60       46. - 48.     246      2.06      4600. - 4800.       0       .00
  24. - 25.      242      2.02       48. - 50.     317      2.65      4800. - 5000.       0       .00
  25. - 26.       41       .34       50. - 52.     209      1.75
  26. - 27.        0       .00       52. - 54.     101       .84
  27. - 28.        0       .00       54. - 56.      59       .49
  28. - 29.        0       .00       56. - 58.      15       .13
  29. - 30.        0       .00       58. - 60.       0       .00
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1967 FORD BOX VAN WITH 300 CID I6, 10000 LB. GVW, TEST WT. 9140 LB. TRUCK G-3
RUN DURATION 21.22 MIN., IDLE SPEED 500 RPM.  8/12/.4 RUN 4

 VAR NO       MEAN          S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM   1    1406.8562     728.2352        6.9183   11080     3165.0000     455.0000   2710.0000
MV    2      14.0062       5.4923         .0569   11080       25.0500        .9600     24.0900
SPD   3      20.3610      15.6723         .1489   11080       58.7363        .0000     58.7363
TP    4       4.4678       1.3143         .0125   11080        6.3400       3.0600      5.2800

                                   PERCENT OF TIME                   PERCENT OF TIME
                                   THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                   LEVEL          COUNT   PERCENT    GEAR    COUNT   PERCENT


                                   CLOSED          4295     38.76       1      799     28.84
                                      WOT            80       .72       2      629     22.71
                                                                        3     1342     48.45
                                                                        4        0       .00
                                                                        5        0       .00
                                                                        6        0       .00
                                                                        7        0       .00
PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT
LEVEL             COUNT   PERCENT     LEVEL             COUNT   PERCENT      PERCENT OF TIME RPM AT
          <                                     <                            LEVEL               COUNT   PERCENT
    . -  1.           1       .01         . -  2.        1847     16.67                <
   1. -  2.         157      1.42        2. -  4.         423      3.82            . -  200.        0       .00
   2. -  3.         451      4.07        4. -  6.         343      3.10        200. -  400.         0       .00
   3. -  4.         453      4.09        6. -  8.         435      3.93        400. -  600.      1979     17.86
   4. -  5.         291      2.63        8. - 10.         450      4.06        600. -  800.      1320     11.91
   5. -  6.         257      2.32       10. - 12.         617      5.57        800. - 1000.       614      5.54
   6. -  7.         225      2.03       12. - 14.         458      4.13       1000. - 1200.       860      7.76
   7. -  8.         293      2.64       14. - 16.         287      2.59       1200. - 1400.       830      7.49
   8. -  9.         337      3.04       16. - 18.         301      2.72       1400. - 1600.       953      8.60
   9. - 10.         391      3.53       18. - 20.         397      3.58       1600. - 1800.      1494     13.48
  10. - 11.         441      3.98       20. - 22.         451      4.07       1800. - 2000.      1131     10.21
  11. - 12.         374      3.38       22. - 24.         355      3.20       2000. - 2200.       544      4.91
  12. - 13.         347      3.13       24. - 26.         346      3.12       2200. - 2400.       203      1.83
  13. - 14.         253      2.28       26. - 28.         510      4.60       2400. - 2600.        94       .85
  14. - 15.         761      6.87       28. - 30.         692      6.25       2600. - 2800.        84       .76
  15. - 16.        1805     16.29       30. - 32.         816      7.36       2800. - 3000.       671      6.06
  16. - 17.         882      7.96       32. - 34.         592      5.34       3000. - 3200.       303      2.73
  17. - 18.         593      5.35       34. - 36.         321      2.90       3200. - 3400.         0       .00
  18. - 19.         405      3.66       36. - 38.         274      2.47       3400. - 3600.         0       .00
  19. - 20.         352      3.18       38. - 40.          89       .80       3600. - 3800.         0       .00
  20. - 21.         417      3.76       40. - 42.          28       .25       3800. - 4000.         0       .00
  21. - 22.         709      6.40       42. - 44.          19       .17       4000. - 4200.         0       .00
  22. - 23.         420      3.79       44. - 46.          25       .23       4200. - 4400.         0       .00
  23. - 24.         351      3.17       46. - 48.          37       .33       4400. - 4600.         0       .00
  24. - 25.         113      1.02       48. - 50.          93       .84       4600. - 4800.         0       .00
  25. - 26.           1       .01       50. - 52.         228      2.06       4800. - 5000.         0       .00
  26. - 27.           0       .00       52. - 54.         334      3.01
  27. - 28.           0       .00       54. - 56.         256      2.31
  28. - 29.           0       .00       56. - 58.          53       .48
  29. - 30.           0       .00       58. - 60.           3       .03
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1967 FORD BOX VAN WITH 300 CID I6. 10000 LB. GVW. TEST WT. 9140 LB. TRUCK G-1
RUN DURATION 21.09 MIN., IDLE SPEED 500 RPM.  8/12/74 RUN 6

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1398.1407     846.8798        8.3365   10320       4990.0000       5.0000   4985.0000
MV    2      14.3324       5.5754         .0549   10320         24.7200       1.6200     23.1000
SPD   3      20.8272      14.4746         .1425   10320         55.8695        .0667     55.8028
TP    4       4.4475       1.1246         .0111   10320          8.1100       3.0300      5.0800

                               PERCENT OF TIME                   PERCENT OF TIME
                               THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                               LEVEL        COUNT   PERCENT      GEAR    COUNT   PERCENT


                               CLOSED        3510     34.01         1      856     33.18
                                  WOT          33       .32         2      354     13.72
                                                                    3     1320     51.16
                                                                    4        2       .08
                                                                    5        0       .00
                                                                    6        0       .00
                                                                    7        0       .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT      LEVEL           COUNT   PERCENT        LEVEL            COUNT   PERCENT
       <                                    <                                       <
   . -  1.          0       .00         . -  2.       1866     18.08            . -  200.       45       .44
  1. -  2.         18       .17        2. -  4.        180      1.74         200. -  400.       79       .77
  2. -  3.         58       .56        4. -  6.        188      1.82         400. -  600.     2478     24.01
  3. -  4.        350      3.39        6. -  8.        174      1.69         600. -  800.     1299     12.59
  4. -  5.        464      4.50        8. - 10.        317      3.07         800. - 1000.      434      4.21
  5. -  6.        326      3.16       10. - 12.        334      3.24        1000. - 1200.      409      3.96
  6. -  7.        308      2.98       12. - 14.        483      4.68        1200. - 1400.      510      4.94
  7. -  8.        298      2.89       14. - 16.        448      4.34        1400. - 1600.      889      8.61
  8. -  9.        410      3.97       16. - 18.        391      3.79        1600. - 1800.     1217     11.79
  9. - 10.        272      2.64       18. - 20.        375      3.63        1800. - 2000.      782      7.58
 10. - 11.        291      2.82       20. - 22.        354      3.43        2000. - 2200.      585      5.67
 11. - 12.        272      2.64       22. - 24.        524      5.08        2200. - 2400.      540      5.23
 12. - 13.        283      2.74       24. - 26.        640      6.20        2400. - 2600.      302      2.93
 13. - 14.        450      4.36       26. - 28.        692      6.71        2600. - 2800.      409      3.96
 14. - 15.        876      8.49       28. - 30.        634      6.14        2800. - 3000.       26       .25
 15. - 16.       1787     17.32       30. - 32.        653      6.33        3000. - 3200.       16       .16
 16. - 17.        667      6.46       32. - 34.        427      4.14        3200. - 3400.       11       .11
 17. - 18.        492      4.77       34. - 36.        237      2.30        3400. - 3600.        7       .07
 18. - 19.        581      5.63       36. - 38.        146      1.41        3600. - 3800.       21       .20
 19. - 20.        375      3.63       38. - 40.         79       .77        3800. - 4000.       22       .21
 20. - 21.        416      4.03       40. - 42.         43       .42        4000. - 4200.       43       .42
 21. - 22.        443      4.29       42. - 44.        131      1.27        4200. - 4400.       83       .80
 22. - 23.        398      3.86       44. - 46.        365      3.54        4400. - 4600.       45       .44
 23. - 24.        398      3.86       46. - 48.        324      3.14        4600. - 4800.       36       .35
 24. - 25.         87       .84       48. - 50.        184      1.78        4800. - 5000.       32       .31
 25. - 26.          0       .00       50. - 52.         67       .65
 26. - 27.          0       .00       52. - 54.         44       .43
 27. - 28.          0       .00       54. - 56.         20       .19
 28. - 29.          0       .00       56. - 58.          0       .00
 29. - 30.          0       .00       58. - 60.          0       .00
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1967 FORD 80A VAN WITH 300 CID I6, 10000 LB. GVW, TEST WT. 9140 LB. TRUCK G-1
RUN DURATION 19.80 MIN., IDLE SPEED 500 RPM,  8/12/74 RUN 7

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM     MINIMUM        RANGE
RPM   1    1532.2095     754.3085       7.5280  10040       3480.0000    480.0000    3000.0000
MV    2      13.9559       6.2507        .0624  10040         25.2900      1.2600      24.0300
SPD   3      21.7641      15.6416        .1561  10040         62.2031       .0000      62.2031
TP    4       4.4995       1.2935        .0129  10040          7.7300      3.0400       4.6900

                                    PERCENT OF TIME                PERCENT OF TIME
                                    THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                    LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT


                                    CLOSED        4191     41.74       1      572     22.79
                                       WOT           0       .00       2      311     12.39
                                                                       3      336     13.39
                                                                       4     1287     51.27
                                                                       5        0       .00
                                                                       6        0       .00
                                                                       7        4       .16

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT
        <                                   <                                      <
  . -  1.          0       .00        . -  2.       1608     16.02             . -  200.       0       .00
 1. -  2.         59       .59       2. -  4.        230      2.29          200. -  400.       0       .00
 2. -  3.        277      2.76       4. -  6.        188      1.87          400. -  600.    1029     10.25
 3. -  4.        359      3.58       6. -  8.        256      2.55          600. -  800.    1291     12.86
 4. -  5.        461      4.59       8. - 10.        281      2.80          800. - 1000.     622      6.20
 5. -  6.        467      4.65      10. - 12.        366      3.65         1000. - 1200.     765      7.62
 6. -  7.        411      4.09      12. - 14.        359      3.58         1200. - 1400.     716      7.13
 7. -  8.        325      3.24      14. - 16.        516      5.1          1400. - 1600.    1106     11.02
 8. -  9.        324      3.23      16. - 18.        469      4.67         1600. - 1800.    1041     10.37
 9. - 10.        266      2.65      18. - 20.        404      4.02         1800. - 2000.    1151     11.46
10. - 11.        222      2.21      20. - 22.        442      4.40         2000. - 2200.     763      7.60
11. - 12.        307      3.06      22. - 24.        483      4.81         2200. - 2400.     403      4.01
12. - 13.        402      4.00      24. - 26.        611      6.09         2400. - 2600.     194      1.93
13. - 14.        225      2.24      26. - 28.        480      4.78         2600. - 2800.      60       .60
14. - 15.        853      8.50      28. - 30.        446      4.44         2800. - 3000.     123      1.23
15. - 16.       1226     12.21      30. - 32.        546      5.44         3000. - 3200.     406      4.04
16. - 17.        603      6.01      32. - 34.        475      4.73         3200. - 3400.     303      3.02
17. - 18         398      3.96      34. - 36.        310      3.09         3400. - 3600.      67       .67
18. - 19.        399      3.97      36. - 38.        196      1.95         3600. - 3800.       0       .00
19. - 20.        443      4.41      38. - 40.        218      2.17         3800. - 4000.       0       .00
20. - 21.        439      4.37      40. - 42.        139      1.38         4000. - 4200.       0       .00
21. - 22.        518      5.16      42. - 44.         61       .61         4200. - 4400.       0       .00
22. - 23.        431      4.29      44. - 46.         30       .30         4400. - 4600.       0       .00
23. - 24.        288      2.87      46. - 48.         41       .41         4600. - 4800.       0       .00
24. - 25.        317      3.16      48. - 50.         43       .43         4800. - 5000.       0       .00
25. - 26.         20       .20      50. - 52.        142      1.41
26. - 27.          0       .00      52. - 54.        259      2.58
27. - 28.          0       .00      54. - 56.        232      2.31
28. - 29.          0       .00      56. - 58.        108      1.08
29. - 30.          0       .00      58. - 60.         82       .82
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1967 FORD BOX VAN WITH 300 CID IN, 10000 LB, GVW, TEST WT, 9140 LB, THICK G..
RUN DURATION 18.11 MIN., IDLE SPEED     RPM, 08/13/74 RUN 8

 VAR NO       MEAN          S.D.      S.E. OF MEAN  SAMPLE       MAXIMUM       MINIMUM         RANGE
RPM  1     1577.3371     701.6373       30.2779      537       4300.0000      550.0000     3750.0000
MV   2       15.6732       6.7294         .2904      537         27.3900        3.3000       24.0900
SPD  3       22.5355      13.6269         .5880      537         53.3360        0.0000       53.3360

   PERCENT OF TIME  MV AT                 PERCENT OF TIME  MS AT                    PERCENT OF TIME RPM AT
   LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT             LEVEL           COUNT    PERCENT
        <                                        <                                          <
    0 -   1           0      0.00          0 -   2          52      9.68              0 -   200           0       0.00
    1 -   2           0      0.00          2 -   4           6      1.12            200 -   400           0       0.00
    2 -   3           0      0.00          4 -   6           7      1.30            400 -   600          40       7.45
    3 -   4          13      2.42          6 -   8           6      1.12            600 -   800          37       6.89
    4 -   5          29      5.40          8 -  10          10      1.86            800 -  1000          38       7.08
    5 -   6          17      3.17         10 -  12          26      4.84           1000 -  1200          56      10.43
    6 -   7          15      2.79         12 -  14          31      5.77           1200 -  1400          39       7.26
    7 -   8          20      3.72         14 -  16          37      6.89           1400 -  1600          75      13.97
    8 -   9          19      3.54         16 -  18          29      5.40           1600 -  1800          88      16.39
    9 -  10          30      5.59         18 -  20          30      5.59           1800 -  2000          48       8.94
   10 -  11          21      3.91         20 -  22          29      5.40           2000 -  2200          38       7.08
   11 -  12          22      4.10         22 -  24          34      6.33           2200 -  2400          15       2.79
   12 -  13           8      1.49         24 -  26          39      7.26           2400 -  2600           5        .93
   13 -  14          11      2.05         26 -  28          34      6.33           2600 -  2800           5        .93
   14 -  15          23      4.28         28 -  30          32      5.96           2800 -  3000           8       1.49
   15 -  16          14      2.61         30 -  32          22      4.10           3000 -  3200          34       6.33
   16 -  17          65     12.10         32 -  34          33      6.15           3200 -  3400          11       2.05
   17 -  18          16      2.98         34 -  36           9      1.68           3400 -  3600           0       0.00
   18 -  19          18      3.35         36 -  38           8      1.49           3600 -  3800           0       0.00
   19 -  20          19      3.54         38 -  40           3       .56           3800 -  4000           0       0.00
   20 -  21          26      4.84         40 -  42           2       .37           4000 -  4200           0       0.00
   21 -  22          26      4.84         42 -  44           1       .19           4200 -  4400           0       0.00
   22 -  23          24      4.47         44 -  46           4       .74           4400 -  4600           0       0.00
   23 -  24          39      7.26         46 -  48           5       .93           4600 -  4800           0       0.00
   24 -  25          27      5.03         48 -  50          12      2.23           4800 -  5000           0       0.00
   25 -  26          21      3.91         50 -  52          27      5.03
   26 -  27          11      2.05         52 -  54           9      1.68
   27 -  28           3       .56         54 -  56           0      0.00
   28 -  29           0      0.00         56 -  58           0      0.00
   29 -  30           0      0.00         58 -  60           0      0.00
```

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1967 FORD BOX VAN WITH 300 CID I6, 10000 LB, GVW, TEST WT, 4140 LB, TRUCK G-1
RUN DURATION 19.95 MIN., IDLE SPEED      RPM, 08/13/74 RUN 9

 VAR NO      MEAN        S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM      RANGE
RPM  1    1506.3889    682.5888     28.0070     594       3125.0000    550.0000   2575.0000
MV   2      15.4569      6.7330       .2763     594         27.7200      1.6500     26.0700
SPD  3      20.4727     14.1487       .5805     594         52.0026      0.0000     52.0026

   PERCENT OF TIME  MV AT              PERCENT OF TIME  MS AT              PERCENT OF TIME RPM AT
   LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT
        <                                    <                                      <
   0 -  1           0       0.00        0 -  2          107     18.01         0 -  200        0       0.00
   1 -  2           1        .17        2 -  4            9      1.52       200 -  400        0       0.00
   2 -  3           1        .17        4 -  6            8      1.35       400 -  600       73      12.29
   3 -  4          24       4.04        6 -  8           12      2.02       600 -  800       66      11.11
   4 -  5          28       4.71        8 - 10           18      3.03       800 - 1000       22       3.70
   5 -  6          15       2.53       10 - 12           25      4.21      1000 - 1200       35       5.89
   6 -  7          18       3.03       12 - 14           22      3.70      1200 - 1400       51       8.59
   7 -  8          22       3.70       14 - 16           21      3.54      1400 - 1600       74      12.46
   8 -  9          26       4.38       16 - 18           24      4.04      1600 - 1800       75      12.63
   9 - 10          18       3.03       18 - 20           21      3.54      1800 - 2000       71      11.95
  10 - 11          16       2.69       20 - 22           46      7.74      2000 - 2200       35       5.89
  11 - 12          21       3.54       22 - 24           32      5.39      2200 - 2400       24       4.04
  12 - 13          15       2.53       24 - 26           25      4.21      2400 - 2600       16       2.69
  13 - 14          14       2.36       26 - 28           30      5.05      2600 - 2800       20       3.37
  14 - 15          24       4.04       28 - 30           34      5.72      2800 - 3000       21       3.54
  15 - 16          13       2.19       30 - 32           37      6.23      3000 - 3200       11       1.85
  16 - 17         109      18.35       32 - 34           23      3.87      3200 - 3400        0       0.00
  17 - 18          36       6.06       34 - 36           22      3.70      3400 - 3600        0       0.00
  18 - 19          19       3.20       36 - 38           11      1.85      3600 - 3800        0       0.00
  19 - 20          21       3.54       38 - 40            9      1.52      3800 - 4000        0       0.00
  20 - 21          18       3.03       40 - 42            9      1.52      4000 - 4200        0       0.00
  21 - 22          10       1.68       42 - 44            4       .67      4200 - 4400        0       0.00
  22 - 23          16       2.69       44 - 46           13      2.19      4400 - 4600        0       0.00
  23 - 24          30       5.05       46 - 48           17      2.86      4600 - 4800        0       0.00
  24 - 25          21       3.54       48 - 50           10      1.68      4800 - 5000        0       0.00
  25 - 26          25       4.21       50 - 52            3       .51
  26 - 27          24       4.04       52 - 54            2       .34
  27 - 28           9       1.52       54 - 56            0      0.00
  28 - 29           0       0.00       56 - 58            0      0.00
  29 - 30           0       0.00       58 - 60            0      0.00
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TRUCK G-4

1969 CHEVROLET 18000 LB GVW VAN
WITH 350 CID V8 ENGINE

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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB. GVW TEST AT 13475 LB. TR G-4
RUN DURATION [illegible]

 VAR NO      MEAN       S.D.     S.E. OF MEAN  SAMPLE     MAXIMUM     MINIMUM      RANGE
RPM   1   1775.6429   723.5118      7.3388     9720     4260.0000   350.0000   3910.0000
MV    2     13.[illegible]    [illegible]       .[illegible]     9720       23.7000      .0300     23.6700
SPD   3     22.4512    14.[illegible]      .1323     9720       50.9359      .0000     50.9359
TP    4     [illegible]    [illegible]      .[illegible]     9720       [illegible]      .4200      9.5000

                        PERCENT OF TIME               PERCENT OF TIME
                        THROTTLE POSITION AT          GEAR SHIFT POSITION AT
                        LEVEL       COUNT   PERCENT   GEAR    COUNT   PERCENT

                        CLOSED      3558     36.60      1       69      2.84
                          WOT        608      6.26      2      362     14.90
                                                        3      448     18.44
                                                        4     1526     62.80
                                                        5        5       .21
                                                        6        0       .00
                                                        7        5       .21

PERCENT OF TIME  MV AT           PERCENT OF TIME  AS AT           PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT   LEVEL          COUNT   PERCENT   LEVEL             COUNT   PERCENT
        <                                <                                  <
  . -  1.        513     5.28      . -  2.       1110    11.42         . -  200.       0       .00
 1. -  2.        371     3.82     2. -  4.        117     1.20     200. -  400.      14       .14
 2. -  3.        400     4.12     4. -  6.        112     1.15     400. -  600.      99      1.02
 3. -  4.        335     3.45     6. -  8.        211     2.17     600. -  800.    1241     12.77
 4. -  5.        239     2.46     8. - 10.        270     2.78     800. - 1000.     346      3.56
 5. -  6.        206     2.12    10. - 12.        341     3.51    1000. - 1200.     464      4.77
 6. -  7.        232     2.39    12. - 14.        271     2.79    1200. - 1400.     880      9.05
 7. -  8.        238     2.45    14. - 16.        344     3.54    1400. - 1600.     856      8.81
 8. -  9.        229     2.36    16. - 18.        466     4.79    1600. - 1800.    1355     13.94
 9. - 10.        244     2.51    18. - 20.        638     6.56    1800. - 2000.     760      7.82
10. - 11.        291     2.99    20. - 22.        518     5.33    2000. - 2200.    1409     14.50
11. - 12.        337     3.47    22. - 24.        700     7.20    2200. - 2400.     541      5.57
12. - 13.        401     4.13    24. - 26.        872     8.97    2400. - 2600.     230      2.37
13. - 14.        395     4.06    26. - 28.        596     6.13    2600. - 2800.     201      2.07
14. - 15.        434     4.47    28. - 30.        440     4.53    2800. - 3000.     614      6.32
15. - 16.        899     9.25    30. - 32.        698     7.18    3000. - 3200.     540      5.56
16. - 17.        901     9.27    32. - 34.        603     6.20    3200. - 3400.     115      1.18
17. - 18.        396     4.07    34. - 36.        186     1.91    3400. - 3600.      35       .36
18. - 19.        317     3.26    36. - 38.         48      .49    3600. - 3800.      16       .16
19. - 20.        [illegible]     [illegible]    38. - 40.         36      .37    3800. - 4000.       2       .02
20. - 21.        [illegible]     [illegible]    40. - 42.         53      .55    4000. - 4200.       1       .01
21. - 22.        629     6.47    42. - 44.        178     1.83    4200. - 4400.       1       .01
22. - 23.        [illegible]     [illegible]    44. - 46.        462     4.75    4400. - 4600.       0       .00
23. - 24.        263     [illegible]    46. - 48.        317     3.26    4600. - 4800.       0       .00
24. - 25.          0      .00    48. - 50.        118     1.21    4800. - 5000.       0       .00
25. - 26.          0      .00    50. - 52.         15      .15
26. - 27.          0      .00    52. - 54.          0      .00
27. - 28.          0      .00    54. - 56.          0      .00
28. - 29.          0      .00    56. - 58.          0      .00
29. - 30.          0      .00    58. - 60.          0      .00
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1969 CHEVROLET M-X VAN WITH 350 CID V8, 18000 LB. GVW TEST WT. 13675 LB. TP G-6
RUN DURATION 16.27 MT ,, IDLE SPEED 650 RPM,  8/22/74 RUN

 VAR NO.     MEAN         S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
 RPM   1   1755.5456    685.5649      6.9970     9600      3605.0000     430.0000    3175.0000
 MV    2     13.6734      7.3918       .0756     9600        26.7000        .0900      26.6100
 SPD   3     22.7587     13.2559       .1353     9600        50.5359        .0000      50.5359
 TP    4      2.6255      2.4690       .0252     9600         9.9300        .5200       9.4100

                          PERCENT OF TIME                      PERCENT OF TIME
                          THROTTLE POSITION AT                 GEAR SHIFT POSITION AT
                          LEVEL        COUNT    PERCENT        GEAR    COUNT   PERCENT


                          CLOSED        3580     37.29          1         0       .00
                             WOT         430      4.48          2       437     18.21
                                                                3       270     11.25
                                                                4      1687     70.29
                                                                5         1       .04
                                                                6         0       .00
                                                                7         5       .21

PERCENT OF TIME  MV AT                PERCENT OF TIME  MS AT                  PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT          LEVEL           COUNT   PERCENT
       <                                     <                                         <
  . -  1.        404      4.21          . -  2.       1221     12.72             . -  200.         0       .00
 1. -  2.        549      5.72         2. -  4.        118      1.23          200. -  400.         0       .00
 2. -  3.        345      3.59         4. -  6.        124      1.29          400. -  600.        30       .31
 3. -  4.        225      2.34         6. -  8.        203      2.11          600. -  800.      1371     14.28
 4. -  5.        226      2.35         8. - 10.        275      2.86          800. - 1000.       392      4.08
 5. -  6.        246      2.56        10. - 12.        286      2.98         1000. - 1200.       328      3.42
 6. -  7.        252      2.62        12. - 14.        245      2.55         1200. - 1400.       777      8.09
 7. -  8.        226      2.35        14. - 16.        266      2.77         1400. - 1600.       716      7.46
 8. -  9.        219      2.28        16. - 18.        284      2.96         1600. - 1800.      1110     11.56
 9. - 10.        230      2.40        18. - 20.        440      4.58         1800. - 2000.      1933     20.14
10. - 11.        232      2.42        20. - 22.        460      4.79         2000. - 2200.      1075     11.20
11. - 12.        301      3.14        22. - 24.        505      5.26         2200. - 2400.       402      4.19
12. - 13.        330      3.44        24. - 26.        618      6.44         2400. - 2600.       160      1.67
13. - 14.        313      3.26        26. - 28.        937      9.76         2600. - 2800.       169      1.76
14. - 15.        315      3.28        28. - 30.       1161     12.09         2800. - 3000.       353      3.68
15. - 16.        696      7.25        30. - 32.        679      7.07         3000. - 3200.       720      7.50
16. - 17.        962     10.02        32. - 34.        391      4.07         3200. - 3400.        50       .52
17. - 18.        361      3.76        34. - 36.        175      1.82         3400. - 3600.        13       .14
18. - 19.        386      4.02        36. - 38.         44       .46         3600. - 3800.         1       .01
19. - 20.        463      4.82        38. - 40.         35       .36         3800. - 4000.         0       .00
20. - 21.        318      3.31        40. - 42.         61       .64         4000. - 4200.         0       .00
21. - 22.        529      5.51        42. - 44.        155      1.61         4200. - 4400.         0       .00
22. - 23.        748      7.79        44. - 46.        492      5.12         4400. - 4600.         0       .00
23. - 24.        202      2.10        46. - 48.        169      1.76         4600. - 4800.         0       .00
24. - 25.        143      1.49        48. - 50.         65       .68         4800. - 5000.         0       .00
25. - 26.        282      2.94        50. - 52.          5       .05
26. - 27.         97      1.01        52. - 54.          0       .00
27. - 28.          0       .00        54. - 56.          0       .00
28. - 29.          0       .00        56. - 58.          0       .00
29. - 30.          0       .00        58. - 60.          0       .00
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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB. GVW TEST WT. 13475 LB. TK G-4
RUN DURATION 18.89 MIN., IDLE SPEED 650 RPM.  8/22/74 RUN 1

 VAR NO      MEAN        S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1748.8511    667.6896       6.6261   10160      3755.0000    400.0000   3355.0000
MV    2     14.6055      7.3775        .0732   10160        25.6200       .0900     25.5300
SPD   3     21.6951     12.6781        .1258   10160        49.8692       .0000     49.8692
TP    4      2.5297      2.4891        .0247   10160         9.9100       .4700      9.4400

                                  PERCENT OF TIME                  PERCENT OF TIME
                                  THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                  LEVEL          COUNT   PERCENT   GEAR     COUNT   PERCENT


                                  CLOSED          3997     39.34      1         0       .00
                                     WOT           396      3.90      2       409     16.10
                                                                      3       508     20.00
                                                                      4      1592     62.68
                                                                      5        31      1.22
                                                                      6         0       .00
                                                                      7         0       .00

PERCENT OF TIME  MV AT           PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT   LEVEL          COUNT   PERCENT     LEVEL           COUNT   PERCENT
       <                                <                                  <
   . -  1.       295      2.90       . -  2.     1238     12.19           . -  200.     0       .00
  1. -  2.       406      4.00      2. -  4.      140      1.38       200. -  400.      0       .00
  2. -  3.       394      3.88      4. -  6.      150      1.48       400. -  600.     46       .45
  3. -  4.       238      2.34      6. -  8.      202      1.99       600. -  800.   1101     10.84
  4. -  5.       149      1.46      8. - 10.      196      1.93       800. - 1000.    671      6.60
  5. -  6.       226      2.22     10. - 12.      292      2.87      1000. - 1200.    422      4.15
  6. -  7.       236      2.32     12. - 14.      422      4.15      1200. - 1400.    725      7.14
  7. -  8.       224      2.20     14. - 16.      647      6.37      1400. - 1600.   1016     10.00
  8. -  9.       254      2.50     16. - 18.      429      4.22      1600. - 1800.   1437     14.14
  9. - 10.       247      2.43     18. - 20.      480      4.72      1800. - 2000.   1632     16.06
 10. - 11.       256      2.52     20. - 22.      510      5.02      2000. - 2200.   1069     10.52
 11. - 12.       311      3.06     22. - 24.      645      6.35      2200. - 2400.    382      3.76
 12. - 13.       423      4.16     24. - 26.      675      6.64      2400. - 2600.    227      2.23
 13. - 14.       411      4.05     26. - 28.      926      9.11      2600. - 2800.    316      3.11
 14. - 15.       275      2.71     28. - 30.      886      8.72      2800. - 3000.    590      5.81
 15. - 16.       332      3.27     30. - 32.      707      6.96      3000. - 3200.    441      4.34
 16. - 17.       349      3.43     32. - 34.      256      2.52      3200. - 3400.     60       .59
 17. - 18.       451      4.44     34. - 36.      141      1.39      3400. - 3600.     19       .19
 18. - 19.      1172     11.54     36. - 38.       51       .50      3600. - 3800.      6       .06
 19. - 20.       572      5.63     38. - 40.       44       .43      3800. - 4000.      0       .00
 20. - 21.       304      2.99     40. - 42.      178      1.75      4000. - 4200.      0       .00
 21. - 22.       451      4.44     42. - 44.      335      3.30      4200. - 4400.      0       .00
 22. - 23.       491      4.83     44. - 46.      342      3.37      4400. - 4600.      0       .00
 23. - 24.       542      5.33     46. - 48.      193      1.90      4600. - 4800.      0       .00
 24. - 25.       724      7.13     48. - 50.       25       .25      4800. - 5000.      0       .00
 25. - 26.       157      1.55     50. - 52.        0       .00
 26. - 27.         0       .00     52. - 54.        0       .00
 27. - 28.         0       .00     54. - 56.        0       .00
 28. - 29.         0       .00     56. - 58.        0       .00
 29. - 30.         0       .00     58. - 60.        0       .00
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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB. GVW TEST WT. 13475 LB. TR G-4
RUN DURATION 20.79 MIN., IDLE SPEED 650 RPM,  8/22/74 RUN 4

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1869.1621    799.0653       7.5640  11160       3990.0000     505.0000   3485.0000
MV    2      13.7482      6.9741        .0661  11160         23.7000        .0900     23.6100
SPD   3      19.7875     14.4905        .1372  11160         55.4028        .0000     55.4028
TP    4       2.4014      2.1942        .0208  11160          9.0300        .4700      8.5600

                                  PERCENT OF TIME                PERCENT OF TIME
                                 THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT

                                 CLOSED        4612     41.33       1        0       .00
                                    WOT          13       .12       2      769     27.56
                                                                    3      694     24.87
                                                                    4     1327     47.56
                                                                    5        0       .00
                                                                    6        0       .00
                                                                    7        0       .00

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT               PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT       LEVEL          COUNT    PERCENT
       <                                   <                                    <
  . -  1.        368      3.30        . -  2.       2069     18.54          . -  200.       0        .00
 1. -  2.        653      5.85       2. -  4.        194      1.74       200. -  400.       0        .00
 2. -  3.        483      4.33       4. -  6.        318      2.85       400. -  600.      11        .10
 3. -  4.        254      2.28       6. -  8.        380      3.41       600. -  800.    1174      10.52
 4. -  5.        261      2.34       8. - 10.        385      3.45       800. - 1000.     956       8.57
 5. -  6.        236      2.11      10. - 12.        370      3.32      1000. - 1200.     685       6.14
 6. -  7.        243      2.16      12. - 14.        320      2.87      1200. - 1400.     808       7.24
 7. -  8.        216      1.94      14. - 16.        595      5.33      1400. - 1600.     814       7.29
 8. -  9.        242      2.17      16. - 18.        570      5.11      1600. - 1800.     846       7.58
 9. - 10.        265      2.37      18. - 20.        534      4.78      1800. - 2000.     955       8.56
10. - 11.        303      2.72      20. - 22.        428      3.84      2000. - 2200.    1162      10.41
11. - 12.        393      3.52      22. - 24.        565      5.06      2200. - 2400.     994       8.91
12. - 13.        464      4.16      24. - 26.        483      4.33      2400. - 2600.     635       5.69
13. - 14.        386      3.46      26. - 28.        514      4.61      2600. - 2800.     469       4.20
14. - 15.        304      2.72      28. - 30.        390      3.49      2800. - 3000.     288       2.58
15. - 16.        591      5.30      30. - 32.        580      5.20      3000. - 3200.     475       4.26
16. - 17.       1178     10.56      32. - 34.        674      6.04      3200. - 3400.     598       5.36
17. - 18.        727      6.51      34. - 36.        416      3.73      3400. - 3600.     201       1.80
18. - 19.        586      5.25      36. - 38.        224      2.01      3600. - 3800.      71        .64
19. - 20.        522      4.68      38. - 40.        151      1.35      3800. - 4000.      18        .16
20. - 21.        567      5.08      40. - 42.        101       .91      4000. - 4200.       0        .00
21. - 22.        691      6.19      42. - 44.         67       .60      4200. - 4400.       0        .00
22. - 23.        964      8.64      44. - 46.        112      1.00      4400. - 4600.       0        .00
23. - 24.        263      2.36      46. - 48.        257      2.30      4600. - 4800.       0        .00
24. - 25.          0       .00      48. - 50.        262      2.35      4800. - 5000.       0        .00
25. - 26.          0       .00      50. - 52.        146      1.31
26. - 27.          0       .00      52. - 54.         52       .47
27. - 28.          0       .00      54. - 56.          3       .03
28. - 29.          0       .00      56. - 58.          0       .00
29. - 30.          0       .00      58. - 60.          0       .00
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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB, GVW, TEST WT, 13475 LB, TK G-4
RUN DURATION 21,46 MIN., IDLE SPEED      RPM, 08/22/74 RUN 5

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM  1     1803,6493    853,7814      33,9348      633       4000,0000    535,0000    3465,0000
MV   2       16,0393      7,2368        ,2876      633         27,7200      0,0000      27,7200
SPD  3       19,1346     13,8907        ,5521      633         59,0027      0,0000      59,0027

  PERCENT OF TIME  MV AT              PERCENT OF TIME  WB AT               PERCENT OF TIME RPM AT
  LEVEL          COUNT  PERCENT        LEVEL          COUNT  PERCENT          LEVEL          COUNT  PERCENT
      <                                    <                                      <
  0 -   1         15      2,37         0 -   2        113     17,85          0 -  200          0      0,00
  1 -   2         10      1,58         2 -   4         10      1,58        200 -  400          0      0,00
  2 -   3          9      1,42         4 -   6         19      3,00        400 -  600          1       ,16
  3 -   4         17      2,69         6 -   8         18      2,84        600 -  800        116     18,33
  4 -   5         23      3,63         8 -  10         16      2,53        800 - 1000         30      4,74
  5 -   6         13      2,05        10 -  12         24      3,79       1000 - 1200         34      5,37
  6 -   7         14      2,21        12 -  14         23      3,63       1200 - 1400         44      6,95
  7 -   8         12      1,90        14 -  16         32      5,06       1400 - 1600         45      7,11
  8 -   9         17      2,69        16 -  18         38      6,00       1600 - 1800         51      8,06
  9 -  10         21      3,32        18 -  20         39      6,16       1800 - 2000         49      7,74
 10 -  11         10      1,58        20 -  22         38      6,00       2000 - 2200         68     10,74
 11 -  12         12      1,90        22 -  24         36      5,69       2200 - 2400         44      6,95
 12 -  13         19      3,00        24 -  26         29      4,58       2400 - 2600         29      4,58
 13 -  14         31      4,90        26 -  28         33      5,21       2600 - 2800         16      2,53
 14 -  15         21      3,32        28 -  30         32      5,06       2800 - 3000         23      3,63
 15 -  16         18      2,84        30 -  32         34      5,37       3000 - 3200         34      5,37
 16 -  17         21      3,32        32 -  34         26      4,11       3200 - 3400         25      3,95
 17 -  18         49      7,74        34 -  36          8      1,26       3400 - 3600         13      2,05
 18 -  19         50      7,90        36 -  38          2       ,32       3600 - 3800          9      1,42
 19 -  20         51      8,06        38 -  40          2       ,32       3800 - 4000          1       ,16
 20 -  21         22      3,48        40 -  42          1       ,16       4000 - 4200          1       ,16
 21 -  22         23      3,63        42 -  44          9      1,42       4200 - 4400          0      0,00
 22 -  23         27      4,27        44 -  46          9      1,42       4400 - 4600          0      0,00
 23 -  24         33      5,21        46 -  48         19      3,00       4600 - 4800          0      0,00
 24 -  25         44      6,95        48 -  50         15      2,37       4800 - 5000          0      0,00
 25 -  26         26      4,11        50 -  52          4       ,63
 26 -  27         11      1,74        52 -  54          2       ,32
 27 -  28         14      2,21        54 -  56          2       ,38
 28 -  29          0      0,00        56 -  58          0      0,00
 29 -  30          0      0,00        58 -  60          0      0,00
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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB. GVW TEST WT. 13475 LB. TR 6-4
RUN DURATION 19.06 MIN., IDLE SPEED 650 RPM,  8/22/74 RUN 6

 VAR NO       MEAN          S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    2031.8665     895.8527       8.8529   10240        4880.0000      85.0000    4795.0000
MV    2      14.7756       7.4407        .0735   10240          26.2800        .8100      25.4700
SPD   3      21.5792      14.8844        .1471   10240          56.3362        .0000      56.3362
TP    4       2.9131       2.7296        .0270   10240           9.9200        .4400       9.4800

                              PERCENT OF TIME                   PERCENT OF TIME
                              THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                              LEVEL          COUNT   PERCENT    GEAR     COUNT   PERCENT

                              CLOSED          4122     40.25
                                 WOT           157      1.53       1         0       .00
                                                                   2       589     23.01
                                                                   3       888     34.69
                                                                   4      1083     42.30
                                                                   5         0       .00
                                                                   6         0       .00
                                                                   7         0       .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  MS AT                PERCENT OF TIME RPM AT
LEVEL            COUNT   PERCENT     LEVEL            COUNT   PERCENT      LEVEL            COUNT   PERCENT
        <                                    <                                     <
   .  -  1.         15       .15        .  -  2.       1569     15.32          .  -  200.       1       .01
  1.  -  2.        317      3.10       2.  -  4.        209      2.04       200. -  400.       2       .02
  2.  -  3.        502      4.90       4.  -  6.        194      1.89       400. -  600.      25       .24
  3.  -  4.        486      4.75       6.  -  8.        295      2.88       600. -  800.    1595     15.58
  4.  -  5.        405      3.96       8.  - 10.        219      2.14       800. - 1000.     418      4.08
  5.  -  6.        297      2.90      10.  - 12.        305      2.98      1000. - 1200.     376      3.67
  6.  -  7.        263      2.57      12.  - 14.        503      4.91      1200. - 1400.     410      4.00
  7.  -  8.        202      1.97      14.  - 16.        654      6.39      1400. - 1600.     478      4.67
  8.  -  9.        206      2.01      16.  - 18.        523      5.11      1600. - 1800.     685      6.69
  9.  - 10.        276      2.70      18.  - 20.        503      4.91      1800. - 2000.     627      6.12
 10.  - 11.        406      3.96      20.  - 22.        362      3.54      2000. - 2200.     946      9.24
 11.  - 12.        321      3.13      22.  - 24.        350      3.42      2200. - 2400.    1300     12.70
 12.  - 13.        272      2.66      24.  - 26.        400      3.91      2400. - 2600.     672      6.56
 13.  - 14.        180      1.76      26.  - 28.        433      4.23      2600. - 2800.     430      4.20
 14.  - 15.        253      2.47      28.  - 30.        545      5.32      2800. - 3000.     326      3.18
 15.  - 16.        257      2.51      30.  - 32.        587      5.73      3000. - 3200.     481      4.70
 16.  - 17.        446      4.36      32.  - 34.        594      5.80      3200. - 3400.     795      7.76
 17.  - 18.       1240     12.11      34.  - 36.        565      5.52      3400. - 3600.     513      5.01
 18.  - 19.        615      6.01      36.  - 38.        218      2.13      3600. - 3800.     133      1.30
 19.  - 20.        333      3.25      38.  - 40.        120      1.17      3800. - 4000.      24       .23
 20.  - 21.        314      3.07      40.  - 42.         30       .29      4000. - 4200.       1       .01
 21.  - 22.        356      3.48      42.  - 44.         30       .29      4200. - 4400.       0       .00
 22.  - 23.        447      4.37      44.  - 46.         88       .86      4400. - 4600.       1       .01
 23.  - 24.        599      5.85      46.  - 48.        168      1.64      4600. - 4800.       0       .00
 24.  - 25.       1006      9.82      48.  - 50.        317      3.10      4800. - 5000.       1       .01
 25.  - 26.        213      2.08      50.  - 52.        258      2.52
 26.  - 27.          3       .03      52.  - 54.        160      1.56
 27.  - 28.          0       .00      54.  - 56.         39       .38
 28.  - 29.          0       .00      56.  - 58.          2       .02
 29.  - 30.          0       .00      58.  - 60.          0       .00
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1969 CHEVROLET HOA VAN WITH 350 CID V8, 18000 LB. GVW TEST WT. 13475 LB. TK G-4
RUN DURATION 18.81 MIN., IDLE SPEED 650 RPM,  8/22/74 RUN 7

 VAR NO        MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1     1883.8269    755.1473         7.5214   10080       4075.0000     530.0000   3545.0000
MV    2       14.2321      7.6795          .0765   10080         25.2600        .5700     24.6900
SPD   3       21.9188     13.3191          .1327   10080         54.8027        .0000     54.8027
TP    4        2.5976      2.4349          .0243   10080          9.7700        .4700      9.3000

                                   PERCENT OF TIME                  PERCENT OF TIME
                                  THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                  LEVEL         COUNT   PERCENT    GEAR     COUNT   PERCENT


                                  CLOSED        4020     39.88        1         0       .00
                                     WOT         228      2.26        2       531     21.07
                                                                      3       289     11.47
                                                                      4      1698     67.38
                                                                      5         0       .00
                                                                      6         0       .00
                                                                      7         2       .08

PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                   PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT         LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT
       <                                      <                                        <
  . -  1.         74       .73           . -  2.       1342     13.31             . -  200.        0       .00
 1. -  2.        450      4.46          2. -  4.        219      2.17          200. -  400.        0       .00
 2. -  3.        693      6.87          4. -  6.        200      1.98          400. -  600.       41       .41
 3. -  4.        565      5.61          6. -  8.        200      1.98          600. -  800.     1406     13.95
 4. -  5.        279      2.77          8. - 10.        192      1.90          800. - 1000.      222      2.20
 5. -  6.        180      1.79         10. - 12.        205      2.03         1000. - 1200.      405      4.02
 6. -  7.        224      2.22         12. - 14.        332      3.29         1200. - 1400.      372      3.69
 7. -  8.        165      1.64         14. - 16.        642      6.37         1400. - 1600.      768      7.62
 8  -  9.        192      1.90         16. - 18.        492      4.88         1600. - 1800.     1181     11.72
 9. - 10.        280      2.78         18. - 20.        283      2.81         1800. - 2000.     1370     13.59
10. - 11.        292      2.90         20. - 22.        427      4.24         2000. - 2200.     1190     11.81
11. - 12.        276      2.74         22. - 24.        555      5.51         2200. - 2400.      798      7.92
12. - 13.        319      3.16         24. - 26.        594      5.89         2400. - 2600.      498      4.94
13. - 14.        391      3.88         26. - 28.        741      7.35         2600. - 2800.      433      4.30
14. - 15.        376      3.73         28. - 30.        830      8.23         2800. - 3000.      543      5.39
15. - 16.        385      3.82         30. - 32.        711      7.05         3000. - 3200.      405      4.02
16. - 17.        719      7.13         32. - 34.        500      4.96         3200. - 3400.      165      1.64
17. - 18.        984      9.76         34. - 36.        293      2.91         3400. - 3600.      231      2.29
18. - 19.        258      2.56         36. - 38.        202      2.00         3600. - 3800.       30       .30
19. - 20.        159      1.58         38. - 40.        143      1.42         3800. - 4000.       16       .16
20. - 21.        250      2.48         40. - 42.        222      2.20         4000. - 4200.        6       .06
21. - 22.        253      2.51         42. - 44.        267      2.65         4200. - 4400.        0       .00
22. - 23.        262      2.60         44. - 46.        237      2.35         4400. - 4600.        0       .00
23. - 24.        860      8.53         46. - 48.         70       .69         4600. - 4800.        0       .00
24. - 25.       1110     11.01         48. - 50.         48       .48         4800. - 5000.        0       .00
25. - 26.         84       .83         50. - 52.         94       .93
26. - 27.          0       .00         52. - 54.         33       .33
27. - 28.          0       .00         54. - 56.          6       .06
28. - 29.          0       .00         56. - 58.          0       .00
29. - 30.          0       .00         58. - 60.          0       .00
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1969 CHEVROLET BOX VAN WITH 350 CID V8. 18000 LB. GVW TEST WT. 13475 LB. TK G-4
RUN DURATION 18.81 MIN., IDLE SPEED 650 RPM. 8/22/74 RUN 8

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM        RANGE
RPM   1     1937.9246      846.3047       8.1436   10800      3955.0000     580.0000    3375.0000
MV    2       14.8809        7.0454        .0678   10800        25.2900        .2100      25.0800
SPD   3       20.3278       15.0071        .1444   10800        58.3363        .0000      58.3363
TP    4        2.6133        2.6072        .0251   10800         9.9000        .4700       9.4300

                                   PERCENT OF TIME                 PERCENT OF TIME
                                   THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT   GEAR     COUNT   PERCENT


                                   CLOSED         4669     43.23       1        2       .07
                                      WOT          210      1.94       2      598     22.15
                                                                       3      540     20.00
                                                                       4     1555     57.59
                                                                       5        2       .07
                                                                       6        0       .00
                                                                       7        3       .11

 PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT         LEVEL           COUNT   PERCENT
        <                                     <                                       <
   . -  1.         45       .42          . -  2.       1940     17.96            . -  200.        0       .00
  1. -  2.        326      3.02         2. -  4.        298      2.76         200. -  400.        0       .00
  2. -  3.        497      4.60         4. -  6.        245      2.27         400. -  600.        2       .02
  3. -  4.        366      3.39         6. -  8.        289      2.68         600. -  800.     1065      9.86
  4. -  5.        218      2.02         8. - 10.        284      2.63         800. - 1000.     1210     11.20
  5. -  6.        242      2.24        10. - 12.        360      3.33        1000. - 1200.      429      3.97
  6. -  7.        278      2.57        12. - 14.        495      4.58        1200. - 1400.      434      4.02
  7. -  8.        247      2.29        14. - 16.        559      5.18        1400. - 1600.      541      5.01
  8. -  9.        226      2.09        16. - 18.        536      4.96        1600. - 1800.      860      7.96
  9. - 10.        363      3.36        18. - 20.        373      3.45        1800. - 2000.     1356     12.56
 10. - 11.        486      4.50        20. - 22.        357      3.31        2000. - 2200.     1080     10.00
 11. - 12.        543      5.03        22. - 24.        451      4.18        2200. - 2400.      992      9.19
 12. - 13.        417      3.86        24. - 26.        410      3.80        2400. - 2600.      596      5.52
 13. - 14.        245      2.27        26. - 28.        764      7.07        2600. - 2800.      337      3.12
 14. - 15.        224      2.07        28. - 30.        699      6.47        2800. - 3000.      285      2.64
 15. - 16.        235      2.18        30. - 32.        632      5.85        3000. - 3200.      326      3.02
 16. - 17.        280      2.59        32. - 34.        465      4.31        3200. - 3400.      481      4.45
 17. - 18.       1386     12.83        34. - 36.        356      3.30        3400. - 3600.      638      5.91
 18. - 19.        920      8.52        36. - 38.        156      1.44        3600. - 3800.      153      1.42
 19. - 20.        381      3.53        38. - 40.         35       .32        3800. - 4000.       15       .14
 20. - 21.        311      2.88        40. - 42.         40       .37        4000. - 4200.        0       .00
 21. - 22.        354      3.28        42. - 44.         29       .27        4200. - 4400.        0       .00
 22. - 23.        370      3.43        44. - 46.         83       .77        4400. - 4600.        0       .00
 23. - 24.       1014      9.39        46. - 48.        210      1.94        4600. - 4800.        0       .00
 24. - 25.        799      7.40        48. - 50.        190      1.76        4800. - 5000.        0       .00
 25. - 26.         27       .25        50. - 52.        245      2.27
 26. - 27.          0       .00        52. - 54.        204      1.89
 27. - 28.          0       .00        54. - 56.         81       .75
 28. - 29.          0       .00        56. - 58.         13       .12
 29. - 30.          0       .00        58. - 60.          1       .01
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1969 CHEVROLET BOX VAN WITH 350 CID V8, 18000 LB. GVW, TEST WT. 13475 LB. IK GVW
RUN DURATION 17.78 MIN., IDLE SPEED     RPM, 08/22/79 RUN 9

 VAR NO      MEAN        S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM  1    1999.8810    793.4866      33.9581     546      3775.0000     525.0000    3250.0000
MV   2      15.8566      7.7653        .3323     546        27.3900        .6600      26.7300
SPD  3      22.6240     14.9924        .6416     546        53.6693        .3333      53.3360

  PERCENT OF TIME  MV AT               PERCENT OF TIME  MB AT              PERCENT OF TIME RPM AT
  LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT      LEVEL            COUNT    PERCENT
      <                                     <                                   <
   0 -  1           3      .55          0 -  2          78     14.29         0 -  200          0       0.00
   1 -  2          10     1.83          2 -  4          10      1.83       200 -  400          0       0.00
   2 -  3          28     5.13          4 -  6           6      1.10       400 -  600          2        .37
   3 -  4          29     5.31          6 -  8          14      2.56       600 -  800         61      11.17
   4 -  5          17     3.11          8 - 10          22      4.03       800 - 1000         31       5.68
   5 -  6          12     2.20         10 - 12          16      2.93      1000 - 1200         11       2.01
   6 -  7          13     2.38         12 - 14          36      6.59      1200 - 1400         27       4.95
   7 -  8           5      .92         14 - 16          21      3.85      1400 - 1600         40       7.33
   8 -  9           8     1.47         16 - 18          21      3.85      1600 - 1800         31       5.68
   9 - 10          18     3.30         18 - 20          20      3.66      1800 - 2000         39       7.14
  10 - 11          14     2.56         20 - 22          17      3.11      2000 - 2200         63      11.54
  11 - 12          20     3.66         22 - 24          21      3.85      2200 - 2400         67      12.27
  12 - 13          15     2.75         24 - 26          19      3.48      2400 - 2600         55      10.07
  13 - 14          11     2.01         26 - 28          18      3.30      2600 - 2800         26       4.76
  14 - 15          23     4.21         28 - 30          19      3.48      2800 - 3000         19       3.48
  15 - 16          13     2.38         30 - 32          26      4.76      3000 - 3200         28       5.13
  16 - 17          17     3.11         32 - 34          48      8.79      3200 - 3400         26       4.76
  17 - 18          17     3.11         34 - 36          30      5.49      3400 - 3600         17       3.11
  18 - 19          81    14.84         36 - 38          25      4.58      3600 - 3800          3        .55
  19 - 20          27     4.95         38 - 40          15      2.75      3800 - 4000          0       0.00
  20 - 21          15     2.75         40 - 42           2       .37      4000 - 4200          0       0.00
  21 - 22          15     2.75         42 - 44           3       .55      4200 - 4400          0       0.00
  22 - 23          10     1.83         44 - 46          13      2.38      4400 - 4600          0       0.00
  23 - 24          20     3.66         46 - 48          13      2.38      4600 - 4800          0       0.00
  24 - 25          32     5.86         48 - 50          16      2.93      4800 - 5000          0       0.00
  25 - 26          46     8.42         50 - 52          12      2.20
  26 - 27          26     4.76         52 - 54           5       .92
  27 - 28           7     1.28         54 - 56           0      0.00
  28 - 29           0     0.00         56 - 58           0      0.00
  29 - 30           0     0.00         58 - 60           0      0.00
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TRUCK G-5

1967 DODGE 19500 LB GVW STAKE BODY
WITH 318 CID V8 ENGINE

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1967 DODGE STAKE TRUCK WITH 318 CID V8*19,500 LB. GVW* TEST AT 13875 LB TK G-5
RUN DURATION 22.17 MIN.* IDLE SPEED 500 RPM 8/29/74 RUN 1

 VAR NO       MEAN         S.D.      S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1319.2253    744.4526        7.0219   11240      3740.0000        .0000   3740.0000
MV    2      11.6384      8.3310         .0786   11240        24.5300        .0000     24.5300
SPD   3      18.8258     14.3830         .1357   11240        52.4693        .0000     52.4693
TP    4       5.5068      1.8430         .0174   11240         9.9900        .0000      9.9900

                              PERCENT OF TIME                 PERCENT OF TIME
                              THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                              LEVEL         COUNT   PERCENT   GEAR    COUNT   PERCENT


                              CLOSED        4746     42.22      1       18       .64
                               WOT          3154     28.06      2      956     34.02
                                                                3      552     19.64
                                                                4     1283     45.66
                                                                5        0       .00
                                                                6        0       .00
                                                                7        1       .04

PERCENT OF TIME  MV AT              PERCENT OF TIME  MS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT
      <                                   <                                   <
  .  -   1.      903      8.03        .  -   2.     2565     22.82         .  -  200.     19       .17
 1.  -   2.     1932     17.19       2.  -   4.      255      2.27      200.  -  400.    810      7.21
 2.  -   3.      798      7.10       4.  -   6.      219      1.95      400.  -  600.   2015     17.93
 3.  -   4.      246      2.19       6.  -   8.      289      2.57      600.  -  800.    592      5.27
 4.  -   5.      165      1.47       8.  -  10.      274      2.44      800.  - 1000.    705      6.27
 5.  -   6.      173      1.54      10.  -  12.      332      2.95     1000.  - 1200.    882      7.85
 6.  -   7.      136      1.21      12.  -  14.      437      3.89     1200.  - 1400.   1121      9.97
 7.  -   8.      157      1.40      14.  -  16.      355      3.16     1400.  - 1600.   1482     13.19
 8.  -   9.      130      1.16      16.  -  18.      381      3.39     1600.  - 1800.   1145     10.19
 9.  -  10.      106       .94      18.  -  20.      513      4.56     1800.  - 2000.    374      3.33
10.  -  11.      119      1.06      20.  -  22.      487      4.33     2000.  - 2200.    332      2.95
11.  -  12.      118      1.05      22.  -  24.      490      4.36     2200.  - 2400.    394      3.51
12.  -  13.      131      1.17      24.  -  26.      748      6.65     2400.  - 2600.    792      7.05
13.  -  14.      164      1.46      26.  -  28.      766      6.83     2600.  - 2800.    258      2.30
14.  -  15.      210      1.87      28.  -  30.      814      7.24     2800.  - 3000.    149      1.33
15.  -  16.      823      7.32      30.  -  32.      672      5.98     3000.  - 3200.     56       .50
16.  -  17.     1720     15.30      32.  -  34.      408      3.63     3200.  - 3400.     50       .44
17.  -  18.      392      3.49      34.  -  36.      113      1.01     3400.  - 3600.     43       .38
18.  -  19.      273      2.43      36.  -  38.       33       .29     3600.  - 3800.     21       .19
19.  -  20.      313      2.78      38.  -  40.       37       .33     3800.  - 4000.      0       .00
20.  -  21.      335      2.98      40.  -  42.       87       .77     4000.  - 4200.      0       .00
21.  -  22.      368      3.27      42.  -  44.       95       .85     4200.  - 4400.      0       .00
22.  -  23.      655      5.83      44.  -  46.      233      2.07     4400.  - 4600.      0       .00
23.  -  24.      771      6.86      46.  -  48.      251      2.23     4600.  - 4800.      0       .00
24.  -  25.      102       .91      48.  -  50.      353      3.14     4800.  - 5000.      0       .00
25.  -  26.        0       .00      50.  -  52.       30       .27
26.  -  27.        0       .00      52.  -  54.        1       .01
27.  -  28.        0       .00      54.  -  56.        0       .00
28.  -  29.        0       .00      56.  -  58.        0       .00
29.  -  30.        0       .00      58.  -  60.        0       .00
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1967 L DGE STAKE TRUCK WITH 318 CID V8,14,500 LB. GVW, TEST AT 13875 LB TW G-5
RUN DURATION 14.92 MIN., IDLE SPEED 500 RPM, 8/29/78 RUN 2

 VAR NO.      MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM       MINIMUM       RANGE
RPM   1    1459.6387     770.3130       7.5535  10400        3955.0000         .0000   3955.0000
MV    2      11.4047       8.1553        .0800  10400          23.7000         .0000     23.7000
SPD   3      20.7529      14.5956        .1431  10400          54.6027         .0000     54.6027
TP    4       5.5502        .4525        .0044  10400           6.3700        4.8800      1.4900

                                   PERCENT OF TIME                 PERCENT OF TIME
                                   THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                   LEVEL        COUNT   PERCENT    GEAR     COUNT    PERCENT


                                   CLOSED        3954     38.02       1         0        .00
                                      WOT        2532     24.35       2       734      28.23
                                                                      3       624      24.00
                                                                      4      1205      46.35
                                                                      5        37       1.42
                                                                      6         0        .00
                                                                      7         0        .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  #S AT              PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL             COUNT   PERCENT
        <                                    <                                   <
   . -  1.        968      9.31         . -  2.       1805     17.36        . -  200.        29        .28
  1. -  2.       1485     14.28        2. -  4.        201      1.93     200. -  400.       643       6.18
  2. -  3.        799      7.68        4. -  6.        218      2.10     400. -  600.      1347      12.95
  3. -  4.        247      2.37        6. -  8.        271      2.61     600. -  800.       412       3.96
  4. -  5.        243      2.34        8. - 10.        266      2.56     800. - 1000.       877       8.43
  5. -  6.        158      1.52       10. - 12.        345      3.32    1000. - 1200.       725       6.97
  6. -  7.        166      1.60       12. - 14.        391      3.76    1200. - 1400.       799       7.6
  7. -  8.        155      1.49       14. - 16.        418      4.02    1400. - 1600.      1101      10.59
  8. -  9.        127      1.22       16. - 18.        593      5.70    1600. - 1800.      1268      12.19
  9. - 10.        125      1.20       18. - 20.        593      5.70    1800. - 2000.       895       8.61
 10. - 11.        174      1.67       20. - 22.        354      3.40    2000. - 2200.       298       2.87
 11. - 12.        180      1.73       22. - 24.        442      4.25    2200. - 2400.       382       3.67
 12. - 13.        168      1.62       24. - 26.        459      4.41    2400. - 2600.       613       5.89
 13. - 14.        252      2.42       26. - 28.        540      5.19    2600. - 2800.       580       5.58
 14. - 15.        249      2.39       28. - 30.        557      5.36    2800. - 3000.       260       2.50
 15. - 16.        434      4.17       30. - 32.        695      6.68    3000. - 3200.        58        .56
 16. - 17.       1412     13.58       32. - 34.        630      6.06    3230. - 3400.        36        .35
 17. - 18.        365      3.51       34. - 36.        403      3.87    3400. - 3600.        35        .34
 18. - 19.        330      3.17       36. - 38.        148      1.42    3600. - 3800.        33        .32
 19. - 20.        392      3.77       38. - 40.         26       .25    3800. - 4000.         9        .09
 20. - 21.        424      4.08       40. - 42.         34       .33    4000. - 4200.         0        .00
 21. - 22.        392      3.77       42. - 44.         56       .54    4200. - 4400.         0        .00
 22. - 23.        762      7.33       44. - 46.        218      2.10    4400. - 4600.         0        .00
 23. - 24.        181      1.74       46. - 48.        229      2.20    4600. - 4800.         0        .00
 24. - 25.          0       .00       48. - 50.        103       .99    4800. - 5000.         0        .00
 25. - 26.          0       .00       50. - 52.        220      2.12
 26. - 27.          0       .00       52. - 54.        176      1.69
 27. - 28.          0       .00       54. - 56.          9       .09
 28. - 29.          0       .00       56. - 58.          0       .00
 29. - 30.          0       .00       58. - 60.          0       .00
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1967 DODGE STAKE TRUCK WITH 318 CID V8,19,500 LB. GVW, TEST WT 13875 LB TK 0-5
RUN DURATION 16.57 MIN., IDLE SPEED 500 RPM, 8/29/74 RUN3

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM   1    1509.0325    646.9763       6.5488     9760     3755.0000    175.0000    3580.0000
MV    2      10.6036      4.7629        .0487     9760       24.2700       .0300      24.2400
SPD   3      22.4355     12.7037        .1286     9760       53.2693       .0000      53.2693
TP    4       5.6132       .4697        .0048     9760        6.3800      4.8500       1.5300

                               PERCENT OF TIME                 PERCENT OF TIME
                               THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                               LEVEL         COUNT   PERCENT   GEAR    COUNT   PERCENT

                               CLOSED         3322     34.04     1         0       .00
                                 WOT          3010     30.84     2       522     21.39
                                                                 3       686     28.11
                                                                 4      1220     50.00
                                                                 5        10       .41
                                                                 6         0       .00
                                                                 7         2       .08

PERCENT OF TIME  MV AT           PERCENT OF TIME  MS AT            PERCENT OF TIME RPM AT
LEVEL            COUNT  PERCENT  LEVEL            COUNT  PERCENT   LEVEL            COUNT   PERCENT
         <                                <                                 <
   .  -  1.        885     9.07     .  -  2.        949     9.72       .  -  200.      1       .01
  1.  -  2.       2353    24.11    2.  -  4.        189     1.94    200.  -  400.    241      2.47
  2.  -  3.        500     5.12    4.  -  6.        189     1.94    400.  -  600.   1003     10.28
  3.  -  4.        252     2.58    6.  -  8.        268     2.75    600.  -  800.    276      2.83
  4.  -  5.        184     1.89    8.  - 10.        275     2.82    800.  - 1000.    477      4.89
  5.  -  6.        182     1.86   10.  - 12.        332     3.40   1000.  - 1200.    830      8.50
  6.  -  7.        177     1.81   12.  - 14.        311     3.19   1200.  - 1400.   1170     11.99
  7.  -  8.        158     1.62   14.  - 16.        318     3.26   1400.  - 1600.   1497     15.34
  8.  -  9.        154     1.58   16.  - 18.        424     4.34   1600.  - 1800.   1513     15.50
  9.  - 10.        140     1.43   18.  - 20.        627     6.42   1800.  - 2000.    796      8.16
 10.  - 11.        135     1.38   20.  - 22.        552     5.66   2000.  - 2200.    398      4.08
 11.  - 12.        111     1.14   22.  - 24.        610     6.25   2200.  - 2400.    708      7.25
 12.  - 13.        101     1.03   24.  - 26.        593     6.08   2400.  - 2600.    314      3.22
 13.  - 14.        159     1.63   26.  - 28.        537     5.50   2600.  - 2800.    307      3.15
 14.  - 15.        200     2.05   28.  - 30.        870     8.91   2800.  - 3000.     93       .95
 15.  - 16.        440     4.51   30.  - 32.        669     6.85   3000.  - 3200.     46       .47
 16.  - 17.        629     6.44   32.  - 34.        596     6.11   3200.  - 3400.     33       .34
 17.  - 18.  [illegible]   3.92   34.  - 36.        276     2.83   3400.  - 3600.     37       .38
 18.  - 19.  [illegible]   2.44   36.  - 38.        123     1.26   3600.  - 3800.     20       .20
 19.  - 20.        242     2.48   38.  - 40.         92      .94   3800.  - 4000.      0       .00
 20.  - 21.        261     2.67   40.  - 42.        127     1.30   4000.  - 4200.      0       .00
 21.  - 22.        418     4.28   42.  - 44.        370     3.79   4200.  - 4400.      0       .00
 22.  - 23.        706     7.23   44.  - 46.        152     1.56   4400.  - 4600.      0       .00
 23.  - 24.  [illegible] [illegible] 46. - 48.       79      .81   4600.  - 4800.      0       .00
 24.  - 25.         90      .92   48.  - 50.        162     1.66   4800.  - 5000.      0       .00
 25.  - 26.          5 [illegible] 50. - 52.         67      .69
 26.  - 27.          0      .00   52.  - 54.          3      .03
 27.  - 28.          0      .00   54.  - 56.          0      .00
 28.  - 29.          0      .00   56.  - 58.          0      .00
 29.  - 30.          0      .00   58.  - 60.          0      .00
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1967  DODGE STAKE TRUCK WITH 318 CID ...14,500 LB. GVW. TEST AT 13675 LB IW G-5
RUN DURATION 20.48 MIN., IDLE SPEED 500 RPM, 8/29/78 RUN4

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1550.3098    767.7672       7.4292   10680       3720.0000       .0000    3720.0000
MV    2      12.3018      7.6348        .0739   10680         24.3600       .1500      24.2100
SPD   3      20.3449     13.2701        .1284   10680         45.6023       .0000      45.6023
IP    4       5.4450       .3880        .0037   10680          6.3500      4.8500       1.5000

                         PERCENT OF TIME                     PERCENT OF TIME
                        THROTTLE POSITION AT                GEAR SHIFT POSITION AT
                        LEVEL        COUNT   PERCENT        GEAR     COUNT   PERCENT


                        CLOSED        3701     34.65          1         0       .00
                           WOT        1443     13.51          2       732     27.42
                                                              3       767     28.73
                                                              4      1171     43.86
                                                              5         0       .00
                                                              6         0       .00
                                                              7         0       .00

 PERCENT OF TIME  MV AT            PERCENT OF TIME  #S AT            PERCENT OF TIME RPM AT
 LEVEL         COUNT   PERCENT     LEVEL         COUNT   PERCENT     LEVEL          COUNT   PERCENT
          <                                 <                                  <
   .  -  1.      226      2.12       .  -  2.     1992     18.65        .  -  200.     195      1.83
   1. -  2.     1642     15.37      2. -  4.      187      1.75      200. -  400.     401      3.75
   2. -  3.      433      4.05      4. -  6.      266      2.49      400. -  600.    1851     17.33
   3. -  4.      341      3.19      6. -  8.      270      2.53      600. -  800.     126      1.18
   4. -  5.      238      2.23      8. - 10.      172      1.61      800. - 1000.     203      1.90
   5. -  6.      248      2.32     10. - 12.      188      1.76     1000. - 1200.     295      2.76
   6. -  7.      240      2.25     12. - 14.      265      2.48     1200. - 1400.     570      5.34
   7. -  8.      315      2.95     14. - 16.      363      3.40     1400. - 1600.    1022      9.57
   8. -  9.      249      2.33     16. - 18.      450      4.21     1600. - 1800.    1526     14.29
   9. - 10.      180      1.69     18. - 20.      522      4.89     1800. - 2000.    1281     11.99
  10. - 11.      220      2.06     20. - 22.      447      4.19     2000. - 2200.    1144     10.71
  11. - 12.      251      2.35     22. - 24.      495      4.63     2200. - 2400.     846      7.92
  12. - 13.      257      2.41     24. - 26.      531      4.97     2400. - 2600.     569      5.33
  13. - 14.      265      2.48     26. - 28.      768      7.19     2600. - 2800.     279      2.61
  14. - 15.      260      2.43     28. - 30.      760      7.12     2800. - 3000.     145      1.36
  15. - 16.      829      7.76     30. - 32.      708      6.63     3000. - 3200.     111      1.04
  16. - 17.     1563     14.63     32. - 34.      664      6.22     3200. - 3400.      59       .55
  17. - 18.      326      3.05     34. - 36.      491      4.60     3400. - 3600.      45       .42
  18. - 19.      262      2.45     36. - 38.      325      3.04     3600. - 3800.      12       .11
  19. - 20.      249      2.33     38. - 40.      323      3.02     3800. - 4000.       0       .00
  20. - 21.      285      2.67     40. - 42.      231      2.16     4000. - 4200.       0       .00
  21. - 22.      296      2.77     42. - 44.      205      1.92     4200. - 4400.       0       .00
  22. - 23.      823      7.71     44. - 46.       57       .53     4400. - 4600.       0       .00
  23. - 24.      650      6.09     46. - 48.        0       .00     4600. - 4800.       0       .00
  24. - 25.       32       .30     48. - 50.        0       .00     4800. - 5000.       0       .00
  25. - 26.        0       .00     50. - 52.        0       .00
  26. - 27.        0       .00     52. - 54.        0       .00
  27. - 28.        0       .00     54. - 56.        0       .00
  28. - 29.        0       .00     56. - 58.        0       .00
  29. - 30.        0       .00     58  - 60.        0       .00
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1969 DODGE STAKE TRUCK WITH 318 CID V8, 14500 LB. GVW, TEST WT. 13875 LB. TK G=5
RUN DURATION 18.59 MIN., IDLE SPEED      RPM, 08/29/79 RUN 5

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM  1     1998.6882    791.4797       33.5272     558       4100.0000    400.0000   3700.0000
MV   2       12.9909      9.7190         .4114     558         27.0600       .3960     26.6640
SPD  3       28.9768     19.4864         .8248     558         50.6692       .2667     50.4025

  PERCENT OF TIME  MV AT                 PERCENT OF TIME  MB AT                  PERCENT OF TIME RPM AT
  LEVEL             COUNT   PERCENT       LEVEL            COUNT   PERCENT          LEVEL           COUNT   PERCENT
        <                                       <                                         <
   0 -  1             83     14.87          0 -  2           53      9.50            0 -  200         0      0.00
   1 -  2             58     10.39          2 -  4            8      1.43          200 -  400         0      0.00
   2 -  3             22      3.94          4 -  6           10      1.79          400 -  600        37      6.63
   3 -  4             15      2.69          6 -  8           13      2.33          600 -  800        45      8.06
   4 -  5             14      2.51          8 - 10            9      1.61          800 - 1000         5       .90
   5 -  6             16      2.87         10 - 12           13      2.33         1000 - 1200         7      1.25
   6 -  7              7      1.25         12 - 14           23      4.12         1200 - 1400        21      3.76
   7 -  8              8      1.43         14 - 16           24      4.30         1400 - 1600        51      9.14
   8 -  9             13      2.33         16 - 18           27      4.84         1600 - 1800        60     10.75
   9 - 10              8      1.43         18 - 20           44      7.89         1800 - 2000        78     13.98
  10 - 11              7      1.25         20 - 22           33      5.91         2000 - 2200        54      9.68
  11 - 12             11      1.97         22 - 24           31      5.56         2200 - 2400        40      7.17
  12 - 13             10      1.79         24 - 26           50      8.96         2400 - 2600        38      6.81
  13 - 14              5       .90         26 - 28           36      6.45         2600 - 2800        23      4.12
  14 - 15              7      1.25         28 - 30           42      7.53         2800 - 3000        43      7.71
  15 - 16              5       .90         30 - 32           45      8.06         3000 - 3200        38      6.81
  16 - 17              7      1.25         32 - 34           24      4.30         3200 - 3400         9      1.61
  17 - 18             14      2.51         34 - 36            7      1.25         3400 - 3600         3       .54
  18 - 19             58     10.39         36 - 38            1       .18         3600 - 3800         6      1.08
  19 - 20             27      4.84         38 - 40            2       .36         3800 - 4000         2       .36
  20 - 21             11      1.97         40 - 42            1       .18         4000 - 4200         1       .18
  21 - 22             11      1.97         42 - 44           21      3.76         4200 - 4400         0      0.00
  22 - 23             11      1.97         44 - 46           24      4.30         4400 - 4600         0      0.00
  23 - 24             17      3.05         46 - 48           11      1.97         4600 - 4800         0      0.00
  24 - 25             14      2.51         48 - 50            5       .90         4800 - 5000         0      0.00
  25 - 26             56     10.04         50 - 52            1       .18
  26 - 27             42      7.53         52 - 54            0      0.00
  27 - 28              1       .18         54 - 56            0      0.00
  28 - 29              0      0.00         56 - 58            0      0.00
  29 - 30              0      0.00         58 - 60            0      0.00
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1967 DODGE STAKE TRUCK WITH 318 CID V8, 19500 LB, GVW, TEST WT, 13875 LB, TM G-5
RUN DURATION 19.01 MIN., IDLE SPEED     RPM, 08/29/74 RUN 6

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM       RANGE
RPM  1    1684.9649    778.0345      32.5883     570       3340.0000    370.0000    2970.0000
MV   2      13.0191      9.1406        .3829     570         27.8850       .1650      27.7200
SPD  3      21.9843     11.9566        .5008     570         48.6691       .3333      48.3357

  PERCENT OF TIME  MV AT                 PERCENT OF TIME  MS AT                  PERCENT OF TIME RPM AT
  LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT          LEVEL            COUNT   PERCENT
       <                                       <                                        <
   0 -  1          59     10.35            0 -  2          49      8.60             0 -  200         0      0.00
   1 -  2          45      7.89            2 -  4          15      2.63           200 -  400         1       .18
   2 -  3          22      3.86            4 -  6          10      1.75           400 -  600        76     13.33
   3 -  4          12      2.11            6 -  8           8      1.40           600 -  800         6      1.05
   4 -  5          13      2.28            8 - 10          16      2.81           800 - 1000        10      1.75
   5 -  6           7      1.23           10 - 12          21      3.68          1000 - 1200        36      6.32
   6 -  7          18      3.16           12 - 14          17      2.98          1200 - 1400        68     11.93
   7 -  8           9      1.58           14 - 16          26      4.56          1400 - 1600        87     15.26
   8 -  9          16      2.81           16 - 18          27      4.74          1600 - 1800        91     15.96
   9 - 10          25      4.39           18 - 20          41      7.19          1800 - 2000        35      6.14
  10 - 11          11      1.93           20 - 22          46      8.07          2000 - 2200        22      3.86
  11 - 12          10      1.75           22 - 24          32      5.61          2200 - 2400        20      3.51
  12 - 13           7      1.23           24 - 26          40      7.02          2400 - 2600        23      4.04
  13 - 14          14      2.46           26 - 28          42      7.37          2600 - 2800        17      2.98
  14 - 15          18      3.16           28 - 30          43      7.54          2800 - 3000        31      5.44
  15 - 16           9      1.58           30 - 32          51      8.95          3000 - 3200        28      4.91
  16 - 17          16      2.81           32 - 34          11      1.93          3200 - 3400        19      3.33
  17 - 18          11      1.93           34 - 36           3       .53          3400 - 3600         0      0.00
  18 - 19          50      8.77           36 - 38           9      1.58          3600 - 3800         0      0.00
  19 - 20          33      5.79           38 - 40          11      1.93          3800 - 4000         0      0.00
  20 - 21          10      1.75           40 - 42          15      2.63          4000 - 4200         0      0.00
  21 - 22          11      1.93           42 - 44           9      1.58          4200 - 4400         0      0.00
  22 - 23          10      1.75           44 - 46          21      3.68          4400 - 4600         0      0.00
  23 - 24          10      1.75           46 - 48           5       .88          4600 - 4800         0      0.00
  24 - 25          28      4.91           48 - 50           2       .35          4800 - 5000         0      0.00
  25 - 26          50      8.77           50 - 52           0      0.00
  26 - 27          40      7.02           52 - 54           0      0.00
  27 - 28           6      1.05           54 - 56           0      0.00
  28 - 29           0      0.00           56 - 58           0      0.00
  29 - 30           0      0.00           58 - 60           0      0.00
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TRUCK G-6

1968 IHC 27500 LB GVW DUMP BODY
WITH 345 CID V8 ENGINE

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1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 21.88 MIN, IDLE SPEED 510 RPM, 9/10/74 RUN 2

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1   1650.6076    754.3650        6.9682  11720       4500.0000      50.0000   4450.0000
MV    2     11.2409      9.3991         .0868  11720         24.5520      -2.0460     26.5980
SPD   3     18.7264     13.7205         .1267  11720         53.8027        .0000     53.8027
TP    4      4.4483       .5759         .0053  11720          5.5800       3.8300      1.7500

                              PERCENT OF TIME                   PERCENT OF TIME
                              THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                              LEVEL        COUNT   PERCENT      GEAR    COUNT   PERCENT

                              CLOSED         311      2.65         1      801     27.36
                                 WOT        3205     27.35         2      359     12.25
                                                                   3      748     25.53
                                                                   4      330     11.26
                                                                   5      680     23.48
                                                                   6        0       .00
                                                                   7        4       .14

 PERCENT OF TIME  MV AT             PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT     LEVEL          COUNT   PERCENT      LEVEL              COUNT   PERCENT
       <                                  <                                   <
   .  -  1.      3071     26.20        .  -  2.     1973     16.83          .  -   200.        2       .02
  1.  -  2.       595      5.08       2.  -  4.      359      3.06      200.  -   400.       50       .43
  2.  -  3.       346      2.95       4.  -  6.      395      3.37      400.  -   600.     1232     10.51
  3.  -  4.       259      2.21       6.  -  8.      406      3.46      600.  -   800.     1058      9.03
  4.  -  5.       200      1.71       8.  - 10.      364      3.11      800.  -  1000.      443      3.78
  5.  -  6.       163      1.39      10.  - 12.      285      2.43     1000.  -  1200.      693      5.91
  6.  -  7.       173      1.48      12.  - 14.      520      4.44     1200.  -  1400.      906      7.73
  7.  -  8.       162      1.38      14.  - 16.      704      6.01     1400.  -  1600.     1053      8.98
  8.  -  9.       177      1.51      16.  - 18.      740      6.31     1600.  -  1800.     1267     10.81
  9.  - 10.       178      1.52      18.  - 20.      533      4.55     1800.  -  2000.     1287     10.98
 10.  - 11.       136      1.16      20.  - 22.      499      4.26     2000.  -  2200.      949      8.10
 11.  - 12.       140      1.19      22.  - 24.      759      6.48     2200.  -  2400.      555      4.74
 12.  - 13.       139      1.19      24.  - 26.      811      6.92     2400.  -  2600.      557      4.75
 13.  - 14.       145      1.24      26.  - 28.      814      6.95     2600.  -  2800.      642      5.48
 14.  - 15.       138      1.18      28.  - 30.      817      6.97     2800.  -  3000.      733      6.25
 15.  - 16.       110       .94      30.  - 32.      256      2.18     3000.  -  3200.      188      1.60
 16.  - 17.       173      1.48      32.  - 34.      184      1.57     3200.  -  3400.       72       .61
 17.  - 18.      1415     12.07      34.  - 36.      136      1.16     3400.  -  3600.       23       .20
 18.  - 19.       650      5.55      36.  - 38.       94       .80     3600.  -  3800.        8       .07
 19.  - 20.       171      1.46      38.  - 40.       20       .17     3800.  -  4000.        1       .01
 20.  - 21.       182      1.55      40.  - 42.       66       .56     4000.  -  4200.        0       .00
 21.  - 22.       255      2.18      42.  - 44.       81       .69     4200.  -  4400.        0       .00
 22.  - 23.       517      4.41      44.  - 46.      155      1.32     4400.  -  4600.        1       .01
 23.  - 24.      1622     13.84      46.  - 48.      165      1.41     4600.  -  4800.        0       .00
 24.  - 25.       320      2.73      48.  - 50.      295      2.52     4800.  -  5000.        0       .00
 25.  - 26.         0       .00      50.  - 52.      253      2.16
 26.  - 27.         0       .00      52.  - 54.       36       .31
 27.  - 28.         0       .00      54.  - 56.        0       .00
 28.  - 29.         0       .00      56.  - 58.        0       .00
 29.  - 30.         0       .00      58.  - 60.        0       .00
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1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 10960 LB  TRUCK G-6
RUN DURATION 20.42 MIN, IDLE SPEED 510 RPM, 9/10/74 RUN 3

 VAR NO        MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM       RANGE
RPM   1   1236.6602    633.4843        6.0621   10920     3495.0000    170.0000   3325.0000
MV    2     10.6543      9.7811         .0936   10920       24.6180     -.2640      24.8820
SPD   3     20.0496     13.4260         .1285   10920       52.0026      .0000      52.0026
TP    4      4.5140       .6112         .0058   10920        5.6600     3.8300       1.8300

                                      PERCENT OF TIME                 PERCENT OF TIME
                                     THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                     LEVEL        COUNT   PERCENT    GEAR     COUNT   PERCENT


                                     CLOSED         521      4.77       1       539     19.74
                                        WOT        3716     34.03       2       216      7.91
                                                                        3       622     22.78
                                                                        4       551     20.18
                                                                        5       793     29.05
                                                                        6         0       .00
                                                                        7         6       .22

 PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT         LEVEL          COUNT   PERCENT          LEVEL           COUNT   PERCENT
        <                                      <                                       <
    . -  1.      3851     35.27             . -  2.     1505     13.78                . -  200.      2        .02
   1. -  2.       449      4.11            2. -  4.      238      2.18           200. -  400.    569       5.21
   2. -  3.       203      1.86            4. -  6.      334      3.06           400. -  600.   1635      14.97
   3. -  4.       167      1.53            6. -  8.      410      3.75           600. -  800.   1309      11.99
   4. -  5.       154      1.41            8. - 10.      397      3.64           800. - 1000.   1006       9.21
   5. -  6.       129      1.18           10. - 12.      272      2.49          1000. - 1200.    750       6.87
   6. -  7.       138      1.26           12. - 14.      423      3.87          1200. - 1400.    879       8.05
   7. -  8.       137      1.25           14. - 16.      456      4.18          1400. - 1600.   2013      18.43
   8. -  9.       122      1.12           16. - 18.      745      6.82          1600. - 1800.    799       7.32
   9. - 10.       129      1.18           18. - 20.      564      5.16          1800. - 2000.    578       5.29
  10. - 11.       108       .99           20. - 22.      586      5.35          2000. - 2200.    587       5.38
  11. - 12.        94       .86           22. - 24.      572      5.24          2200. - 2400.    324       2.97
  12. - 13.        97       .89           24. - 26.      847      7.76          2400. - 2600.    173       1.58
  13. - 14.        86       .79           26. - 28.      881      8.07          2600. - 2800.     97        .89
  14. - 15.        96       .88           28. - 30.      584      5.35          2800. - 3000.     99        .91
  15. - 16.       104       .95           30. - 32.      460      4.21          3000. - 3200.     67        .61
  16. - 17.       129      1.18           32. - 34.      245      2.24          3200. - 3400.     26        .24
  17. - 18.      1080      9.89           34. - 36.      216      1.98          3400. - 3600.      7        .06
  18. - 19.       528      4.84           36. - 38.       73       .67          3600. - 3800.      0        .00
  19. - 20.       155      1.42           38. - 40.       20       .18          3800. - 4000.      0        .00
  20. - 21.       123      1.13           40. - 42.       31       .28          4000. - 4200.      0        .00
  21. - 22.       233      2.13           42. - 44.       91       .83          4200. - 4400.      0        .00
  22. - 23.       433      3.97           44. - 46.      340      3.11          4400. - 4600.      0        .00
  23. - 24.      1528     13.99           46. - 48.      406      3.72          4600. - 4800.      0        .00
  24. - 25.       513      4.70           48. - 50.      164      1.50          4800. - 5000.      0        .00
  25. - 26.         0       .00           50. - 52.       61       .56
  26. - 27.         0       .00           52. - 54.        1       .01
  27. - 28.         0       .00           54. - 56.        0       .00
  28. - 29.         0       .00           56. - 58.        0       .00
  29. - 30.         0       .00           58. - 60.        0       .00
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1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 23.24 MIN, IDLE SPEED 510 RPM, 9/10/74 RUN 4

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM      RANGE
RPM   1    1053.5664    844.3514      7.5825  12400      4580.0000    385.0000   4195.0000
MV    2      12.4158      8.9431       .0803  12400        24.7170     -.2310     24.9480
SPD   3      17.6447     12.9833       .1166  12400        46.1356      .0000     46.1356
TP    4       4.3502       .4546       .0041  12400         5.4900     3.8200      1.6700

                                   PERCENT OF TIME                 PERCENT OF TIME
                                   THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                   LEVEL       COUNT    PERCENT    GEAR     COUNT   PERCENT

                                   CLOSED        219       1.77       1       971     31.32
                                      WOT       2049      16.52       2       387     12.48
                                                                      3       576     18.58
                                                                      4       707     22.81
                                                                      5       459     14.81
                                                                      6         0       .00
                                                                      7         0       .00

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT     LEVEL            COUNT   PERCENT
        <                                   <                                  <
   . -  1.      2345     18.91         . -  2.      2508     20.23           . -  200.      0       .00
  1. -  2.      1083      8.73        2. -  4.       356      2.87        200. -  400.      5       .04
  2. -  3.       318      2.56        4. -  6.       268      2.16        400. -  600.    852      6.87
  3. -  4.       213      1.72        6. -  8.       432      3.48        600. -  800.   1393     11.23
  4. -  5.       192      1.55        8. - 10.       573      4.62        800. - 1000.    507      4.09
  5. -  6.       192      1.55       10. - 12.       450      3.63       1000. - 1200.    496      4.00
  6. -  7.       197      1.59       12. - 14.       396      3.19       1200. - 1400.    612      4.94
  7. -  8.       166      1.34       14. - 16.       434      3.50       1400. - 1600.    766      6.18
  8. -  9.       147      1.19       16. - 18.       538      4.34       1600. - 1800.   1069      8.62
  9. - 10.       153      1.23       18. - 20.       656      5.29       1800. - 2000.    796      6.42
 10. - 11.       154      1.24       20. - 22.       622      5.02       2000. - 2200.   1079      8.70
 11. - 12.       182      1.47       22. - 24.       996      8.03       2200. - 2400.   1501     12.10
 12. - 13.       168      1.35       24. - 26.       765      6.17       2400. - 2600.   1033      8.33
 13. - 14.       168      1.35       26. - 28.       696      5.61       2600. - 2800.    462      3.73
 14. - 15.       191      1.54       28. - 30.       697      5.62       2800. - 3000.    550      4.44
 15. - 16.       245      1.98       30. - 32.       395      3.19       3000. - 3200.    563      4.54
 16. - 17.       340      2.74       32. - 34.       226      1.82       3200. - 3400.    398      3.21
 17. - 18.      1256     10.13       34. - 36.       116       .94       3400. - 3600.    216      1.74
 18. - 19.       882      7.11       36. - 38.        69       .56       3600. - 3800.     74       .60
 19. - 20.       691      5.57       38. - 40.       316      2.55       3800. - 4000.     23       .19
 20. - 21.       507      4.09       40. - 42.       533      4.30       4000. - 4200.      3       .02
 21. - 22.       403      3.25       42. - 44.       297      2.40       4200. - 4400.      1       .01
 22. - 23.       537      4.33       44. - 46.        60       .48       4400. - 4600.      1       .01
 23. - 24.      1317     10.62       46. - 48.         1       .01       4600. - 4800.      0       .00
 24. - 25.       337      2.72       48. - 50.         0       .00       4800. - 5000.      0       .00
 25. - 26.         0       .00       50. - 52.         0       .00
 26. - 27.         0       .00       52. - 54.         0       .00
 27. - 28.         0       .00       54. - 56.         0       .00
 28. - 29.         0       .00       56. - 58.         0       .00
 29. - 30.         0       .00       58. - 60.         0       .00
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1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 20.51 MIN, IDLE SPEED 510 RPM, 9/10/74 RUN 5

 VAR NO        MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1066.9043    868.8484       8.4231   10640      4995.0000        .0000   4995.0000
MV    2     11.0052      9.1512        .0887   10640        24.5520      -.3630     24.9150
SPD   3     20.4653     13.5835        .1317   10640        53.8027        .0000     53.8027
TP    4      4.4082       .4656        .0045   10640         5.4400      3.8400      1.6000

                                 PERCENT OF TIME                   PERCENT OF TIME
                                THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                LEVEL       COUNT   PERCENT       GEAR    COUNT   PERCENT


                                CLOSED        181      1.70          1      561     21.09
                                   WOT       1854     17.42          2      274     10.30
                                                                     3      689     25.90
                                                                     4      481     18.08
                                                                     5      654     24.59
                                                                     6        0       .00
                                                                     7        1       .04

 PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
 LEVEL           COUNT   PERCENT        LEVEL           COUNT   PERCENT         LEVEL             COUNT   PERCENT
         <                                      <                                       <
    . -  1.      2440     22.93            . -  2.      1570     14.76             . -  200.     270      2.54
   1. -  2.       906      8.52           2. -  4.       176      1.65          200. -  400.     488      4.59
   2. -  3.       335      3.15           4. -  6.       292      2.74          400. -  600.    4674     43.93
   3. -  4.       171      1.61           6. -  8.       328      3.08          600. -  800.    1003      9.43
   4. -  5.       172      1.62           8. - 10.       351      3.30          800. - 1000.     795      7.47
   5. -  6.       199      1.87          10. - 12.       400      3.76         1000. - 1200.     645      6.06
   6. -  7.       173      1.63          12. - 14.       280      2.63         1200. - 1400.     323      3.04
   7. -  8.       173      1.63          14. - 16.       324      3.05         1400. - 1600.     358      3.36
   8. -  9.       152      1.43          16. - 18.       516      4.85         1600. - 1800.     272      2.56
   9. - 10.       176      1.65          18. - 20.       707      6.64         1800. - 2000.     407      3.83
  10. - 11.       148      1.39          20. - 22.       647      6.08         2000. - 2200.     180      1.69
  11. - 12.       136      1.28          22. - 24.       641      6.02         2200. - 2400.     155      1.46
  12. - 13.       142      1.33          24. - 26.       593      5.57         2400. - 2600.     103       .97
  13. - 14.       114      1.07          26. - 28.       687      6.46         2600. - 2800.     170      1.60
  14. - 15.       144      1.35          28. - 30.       873      8.20         2800. - 3000.     211      1.98
  15. - 16.       189      1.78          30. - 32.       570      5.36         3000. - 3200.     150      1.41
  16. - 17.       355      3.34          32. - 34.       436      4.10         3200. - 3400.     102       .96
  17. - 18.      1157     10.87          34. - 36.       139      1.31         3400. - 3600.      98       .92
  18. - 19.       507      4.77          36. - 38.        26       .24         3600. - 3800.      67       .63
  19. - 20.       239      2.25          38. - 40.        23       .22         3800. - 4000.      53       .50
  20. - 21.       197      1.85          40. - 42.        52       .49         4000. - 4200.      30       .28
  21. - 22.       221      2.08          42. - 44.       143      1.34         4200. - 4400.      17       .16
  22. - 23.       415      3.90          44. - 46.       176      1.65         4400. - 4600.      22       .21
  23. - 24.      1251     11.76          46. - 48.       309      2.90         4600. - 4800.      23       .22
  24. - 25.       271      2.55          48. - 50.       311      2.92         4800. - 5000.      24       .23
  25. - 26.         0       .00          50. - 52.        66       .62
  26. - 27.         0       .00          52. - 54.         4       .04
  27. - 28.         0       .00          54. - 56.         0       .00
  28. - 29.         0       .00          56. - 58.         0       .00
  29. - 30.         0       .00          5'. - 60.         0       .00
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1968 IHC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 22.30 MIN, IDLE SPEED 510 RPM, 9/10/74 RUN 6

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM      RANGE
RPM   1    1951.2981    888.9677       8.1560   11880      4185.0000    255.0000   3930.0000
MV    2      12.6439      9.2162        .0846   11880        25.7400     -.7590     26.4990
SPD   3      18.1170     13.3434        .1224   11880        50.9359      .0000     50.9359
TP    4       4.3797       .4797        .0044   11880         8.9800      .0100      8.9700

                                   PERCENT OF TIME                PERCENT OF TIME
                                  THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                  LEVEL          COUNT   PERCENT  GEAR    COUNT   PERCENT


                                  CLOSED           569     4.79      1      899     30.27
                                     WOT          1983    16.69      2      232      7.81
                                                                     3      773     26.03
                                                                     4      774     26.06
                                                                     5      290      9.76
                                                                     6        0       .00
                                                                     7        1       .03

PERCENT OF TIME  MV AT           PERCENT OF TIME  WS AT            PERCENT OF TIME RPM AT
LEVEL         COUNT   PERCENT    LEVEL         COUNT   PERCENT     LEVEL            COUNT   PERCENT
       <                                <                                  <
  . -  1.        26       .22       . -  2.     2370     19.95          . -  200.       0       .00
 1. -  2.      2581     21.73      2. -  4.      246      2.07      200. -  400.       2       .02
 2. -  3.      1174      9.88      4. -  6.      272      2.29      400. -  600.     961      8.09
 3. -  4.       395      3.32      6. -  8.      340      2.86      600. -  800.    1362     11.46
 4. -  5.       221      1.86      8. - 10.      496      4.18      800. - 1000.     181      1.52
 5. -  6.       168      1.41     10. - 12.      431      3.63     1000. - 1200.     224      1.89
 6. -  7.       196      1.65     12. - 14.      361      3.04     1200. - 1400.     478      4.02
 7. -  8.       179      1.51     14. - 16.      452      3.80     1400. - 1600.     637      5.36
 8. -  9.       153      1.29     16. - 18.      653      5.50     1600. - 1800.     898      7.56
 9. - 10.       159      1.34     18. - 20.      843      7.10     1800. - 2000.     919      7.74
10. - 11.       139      1.17     20. - 22.      626      5.27     2000. - 2200.    1279     10.77
11. - 12.       133      1.12     22. - 24.      675      5.68     2200. - 2400.    1004      8.45
12. - 13.       156      1.31     24. - 26.      778      6.55     2400. - 2600.     880      7.41
13. - 14.       136      1.14     26. - 28.      718      6.04     2600. - 2800.    1025      8.63
14. - 15.       128      1.08     28. - 30.      902      7.59     2800. - 3000.     627      5.28
15. - 16.       125      1.05     30. - 32.      436      3.67     3000. - 3200.     439      3.70
16. - 17.       120      1.01     32. - 34.      100       .84     3200. - 3400.     361      3.04
17. - 18.       263      2.21     34. - 36.       30       .25     3400. - 3600.     339      2.85
18. - 19.      1431     12.05     36. - 38.       25       .21     3600. - 3800.     141      1.19
19. - 20.       921      7.75     38. - 40.       21       .18     3800. - 4000.      99       .83
20. - 21.       270      2.27     40. - 42.      114       .96     4000. - 4200.      24       .20
21. - 22.       243      2.05     42. - 44.      317      2.67     4200. - 4400.       0       .00
22. - 23.       277      2.33     44. - 46.      324      2.73     4400. - 4600.       0       .00
23. - 24.       440      3.70     46. - 48.      266      2.24     4600. - 4800.       0       .00
24. - 25.      1275     10.73     48. - 50.       79       .66     4800. - 5000.       0       .00
25. - 26.       568      4.78     50. - 52.        5       .04
26. - 27.         0       .00     52. - 54.        0       .00
27. - 28.         0       .00     54. - 56.        0       .00
28. - 29.         0       .00     56. - 58.        0       .00
29. - 30.         0       .00     58. - 60.        0       .00
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1968 IMC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 21.41 MIN. IDLE SPEED 510 RPM, 9/11/74 RUN 7

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1713.7183    778.8928        7.2950  11400      3780.0000     370.0000   3410.0000
MV    2      12.3512      9.3972         .0880  11400        25.5750      -2.0130     27.5880
SPD   3      18.9797     13.1620         .1233  11400        50.4025        .0000     50.4025
TP    4       4.4440       .5737         .0054  11400         6.4200       3.7800      2.6400
                                  PERCENT OF TIME                 PERCENT OF TIME
                                  THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                  LEVEL        COUNT   PERCENT    GEAR     COUNT   PERCENT

                                  CLOSED         316      2.77      1        741     26.00
                                     WOT        3286     28.82      2        239      8.39
                                                                    3        285     10.00
                                                                    4        613     21.51
                                                                    5        743     26.07
                                                                    6         52      1.82
                                                                    7        126      4.42

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT               PERCENT OF TIME RPM AT
LEVEL         COUNT   PERCENT       LEVEL         COUNT   PERCENT        LEVEL          COUNT   PERCENT
       <                                   <                                   <
  . -  1.       37       .32          . -  2.      1889     16.57            . -  200.      0        .00
 1. -  2.     3254     28.54         2. -  4.       317      2.78         200. -  400.      1        .01
 2. -  3.      676      5.93         4. -  6.       391      3.43         400. -  600.   1216      10.67
 3. -  4.      208      1.82         6. -  8.       282      2.47         600. -  800.   1032       9.05
 4. -  5.      197      1.73         8. - 10.       494      4.33         800. - 1000.    401       3.52
 5. -  6.      188      1.65        10. - 12.       404      3.54        1000. - 1200.    736       6.46
 6. -  7.      175      1.54        12. - 14.       284      2.49        1200. - 1400.    673       5.90
 7. -  8.      179      1.57        14. - 16.       553      4.85        1400. - 1600.    800       7.02
 8. -  9.      179      1.57        16. - 18.       575      5.04        1600. - 1800.   1064       9.33
 9. - 10.      163      1.43        18. - 20.       531      4.66        1800. - 2000.   1033       9.06
10. - 11.      148      1.30        20. - 22.       714      6.26        2000. - 2200.   1139       9.99
11. - 12.      112       .98        22. - 24.       515      4.52        2200. - 2400.    899       7.89
12. - 13.      115      1.01        24. - 26.       683      5.99        2400. - 2600.    815       7.15
13. - 14.      105       .92        26. - 28.       748      6.56        2600. - 2800.    590       5.18
14. - 15.      116      1.02        28. - 30.       859      7.54        2800. - 3000.    475       4.17
15. - 16.      139      1.22        30. - 32.       506      4.44        3000. - 3200.    315       2.76
16. - 17.      151      1.32        32. - 34.       369      3.24        3200. - 3400.    148       1.30
17. - 18.      156      1.37        34. - 36.       167      1.46        3400. - 3600.     39        .34
18. - 19.     1391     12.20        36. - 38.        70       .61        3600. - 3800.     24        .21
19. - 20.      705      6.18        38. - 40.        88       .77        3800. - 4000.      0        .00
20. - 21.      198      1.74        40. - 42.       312      2.74        4000. - 4200.      0        .00
21. - 22.      194      1.70        42. - 44.       220      1.93        4200. - 4400.      0        .00
22. - 23.      261      2.29        44. - 46.       239      2.10        4400. - 4600.      0        .00
23. - 24.      456      4.00        46. - 48.       105       .92        4600. - 4800.      0        .00
24. - 25.     1446     12.68        48. - 50.        73       .64        4800. - 5000.      0        .00
25. - 26.      448      3.93        50. - 52.        12       .11
26. - 27.        0       .00        52. - 54.         0       .00
27. - 28.        0       .00        54. - 56.         0       .00
28. - 29.        0       .00        56. - 58.         0       .00
29. - 30.        0       .00        58. - 60.         0       .00
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1968 IMC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 19.82 MIN. IDLE SPEED 510 RPM, 9/11/74 RUN 8

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1731.9883    744.7812        7.2476  10560       4945.0000        .0000   4945.0000
MV    2      11.0885      9.2194         .0897  10560         25.5090      -1.8810     27.3900
SPD   3      20.4841     12.9876         .1264  10560         53.1360        .0000     53.1360
TP    4       4.3729       .4367         .0042  10560          5.3700       3.8100      1.5600

                                      PERCENT OF TIME                    PERCENT OF TI
                                     THROTTLE POSITION AT               GEAR SHIFT POSITION AT
                                     LEVEL        COUNT    PERCENT      GEAR    COUNT   PERCENT


                                     CLOSED         343       3.25         1      540     20.45
                                        WOT        1387      13.13         2      272     10.30
                                                                           3      511     19.36
                                                                           4      677     25.64
                                                                           5      640     24.24
                                                                           6        0       .00
                                                                           7        0       .00

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  WS AT                     PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT             LEVEL           COUNT   PERCENT
           <                                        <                                           <
    . -  1.       386      3.66                . -  2.    1451     13.74                   . -  200.     345      3.27
   1. -  2.      2440     23.11               2. -  4.     257      2.43                200. -  400.     105       .99
   2. -  3.       791      7.49               4. -  6.     168      1.59                400. -  600.     612      5.80
   3. -  4.       512      4.85               6. -  8.     161      1.52                600. -  800.     581      5.50
   4. -  5.       287      2.72               8. - 10.     269      2.55                800. - 1000.     331      3.13
   5. -  6.       318      3.01              10. - 12.     272      2.58               1000. - 1200.     417      3.95
   6. -  7.       298      2.82              12. - 14.     356      3.37               1200. - 1400.     656      6.21
   7. -  8.       233      2.21              14. - 16.     527      4.99               1400. - 1600.     840      7.95
   8. -  9.       182      1.72              16. - 18.     690      6.53               1600. - 1800.    1355     12.83
   9. - 10.       211      2.00              18. - 20.     585      5.54               1800. - 2000.    1513     14.33
  10. - 11.       236      2.23              20. - 22.     818      7.75               2000. - 2200.    1052      9.96
  11. - 12.       162      1.53              22. - 24.     869      8.23               2200. - 2400.     685      6.49
  12. - 13.       121      1.15              24. - 26.     877      8.30               2400. - 2600.     572      5.42
  13. - 14.       170      1.61              26. - 28.     914      8.66               2600. - 2800.     910      8.62
  14. - 15.       159      1.51              28. - 30.     590      5.59               2800. - 3000.     378      3.58
  15. - 16.       106      1.00              30. - 32.     421      3.99               3000. - 3200.     127      1.20
  16. - 17.       118      1.12              32. - 34.     174      1.65               3200. - 3400.      30       .28
  17. - 18.       253      2.40              34. - 36.      36       .34               3400. - 3600.      18       .17
  18. - 19.       611      5.79              36. - 38.      23       .22               3600. - 3800.      12       .11
  19. - 20.       369      3.49              38. - 40.      18       .17               3800. - 4000.       3       .03
  20. - 21.       203      1.92              40. - 42.      15       .14               4000. - 4200.       5       .05
  21. - 22.       109      1.03              42. - 44.     129      1.22               4200. - 4400.       1       .01
  22. - 23.       211      2.00              44. - 46.     373      3.53               4400. - 4600.       3       .03
  23. - 24.       408      3.86              46. - 48.     330      3.12               4600. - 4800.       6       .06
  24. - 25.      1139     10.79              48. - 50.     151      1.43               4800. - 5000.       3       .03
  25. - 26.       522      4.94              50. - 52.      68       .64
  26. - 27.         0       .00              52. - 54.      18       .17
  27. - 28.         0       .00              54. - 56.       0       .00
  28. - 29.         0       .00              56. - 58.       0       .00
  29. - 30.         0       .00              58. - 60.       0       .00
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1968 IMC DUMP TRUCK WITH 345 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK G-6
RUN DURATION 19.43 MIN. IDLE SPEED 510 RPM  9/11/74, RUN 9

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1904.9648    761.6919        7.4834   10360      3760.0000        .0000   3760.0000
MV    2      11.5895      9.0370         .0888   10360        25.1790      -2.3760     27.5550
SPD   3      20.8371     13.2783         .1305   10360        53.2693        .0000     53.2693
TP    4       4.4182       .4995         .0049   10360         5.4100       3.8200      1.5900

                                   PERCENT OF TIME                 PERCENT OF TIME
                                  THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                  LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT

                                  CLOSED        219      2.11        1      594     22.93
                                     WOT       2108     20.35        2      263     10.15
                                                                     3      713     27.53
                                                                     4      614     23.71
                                                                     5      405     15.64
                                                                     6        0       .00
                                                                     7        1       .04

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL            COUNT   PERCENT
       <                                   <                                  <
  .  -  1.       118      1.14        .  -  2.      1326     12.80          .  -  200.     110      1.06
 1.  -  2.      2417     23.33       2.  -  4.       148      1.43       200.  -  400.      31       .30
 2.  -  3.       787      7.60       4.  -  6.       173      1.67       400.  -  600.     350      3.38
 3.  -  4.       528      5.10       6.  -  8.       345      3.33       600.  -  800.    1053     10.16
 4.  -  5.       273      2.64       8.  - 10.       259      2.50       800.  - 1000.     157      1.52
 5.  -  6.       244      2.36      10.  - 12.       307      2.96      1000.  - 1200.     228      2.20
 6.  -  7.       224      2.16      12.  - 14.       388      3.75      1200.  - 1400.     631      6.09
 7.  -  8.       195      1.88      14.  - 16.       567      5.47      1400.  - 1600.     608      5.87
 8.  -  9.       143      1.38      16.  - 18.       910      8.76      1600.  - 1800.     758      7.32
 9.  - 10.       191      1.84      18.  - 20.       725      7.00      1800.  - 2000.    1342     12.95
10.  - 11.       223      2.15      20.  - 22.       466      4.50      2000.  - 2200.    1305     12.60
11.  - 12.       176      1.70      22.  - 24.       452      4.36      2200.  - 2400.    1029      9.93
12.  - 13.       181      1.75      24.  - 26.       641      6.19      2400.  - 2600.     574      5.54
13.  - 14.       178      1.72      26.  - 28.       839      8.10      2600.  - 2800.     801      7.73
14.  - 15.       141      1.36      28.  - 30.       617      5.96      2800.  - 3000.     735      7.09
15.  - 16.       146      1.41      30.  - 32.       657      6.34      3000.  - 3200.     471      4.55
16.  - 17.       175      1.69      32.  - 34.       291      2.81      3200.  - 3400.     124      1.20
17.  - 18.       182      1.76      34.  - 36.       129      1.25      3400.  - 3600.      37       .36
18.  - 19.       711      6.86      36.  - 38.        40       .39      3600.  - 3800.      16       .15
19.  - 20.       681      6.57      38.  - 40.        21       .20      3800.  - 4000.       0       .00
20.  - 21.       200      1.93      40.  - 42.        16       .15      4000.  - 4200.       0       .00
21.  - 22.       144      1.39      42.  - 44.        93       .90      4200.  - 4400.       0       .00
22.  - 23.       166      1.60      44.  - 46.       280      2.70      4400.  - 4600.       0       .00
23.  - 24.       468      4.52      46.  - 48.       242      2.34      4600.  - 4800.       0       .00
24.  - 25.      1430     13.80      48.  - 50.       250      2.41      4800.  - 5000.       0       .00
25.  - 26.        35       .34      50.  - 52.       171      1.65
26.  - 27.         0       .00      52.  - 54.         7       .07
27.  - 28.         0       .00      54.  - 56.         0       .00
28.  - 29.         0       .00      56.  - 58.         0       .00
29.  - 30.         0       .00      58.  - 60.         0       .00
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1968 IMC DUMP TRUCK WITH 365 CID V8, 27500 LB GVW, TEST WT 18960 LB  TRUCK U-6
RUN DURATION 19.83 MIN, IDLE SPEED 510 RPM, 9/11/74 RUN 10

 VAR NO       MEAN        S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM       MINIMUM       RANGE
RPM   1    1861.4868    820.3418       7.9380   10680      3670.0000         .0000   3670.0000
MV    2      11.6724      9.3538        .0905   10680        25.6410        -.8580     26.4990
SPD   3      20.1607     13.5917        .1315   10680        58.3363         .0000     58.3363
TP    4       4.4232       .5109        .0049   10680         5.4300        3.8400      1.5900

                                  PERCENT OF TIME                  PERCENT OF TIME
                                  THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                  LEVEL          COUNT   PERCENT   GEAR    COUNT   PERCENT

                                  CLOSED           334      3.13      1      629     23.56
                                     WOT          2246     21.03      2      288     10.79
                                                                      3      722     27.04
                                                                      4      604     22.62
                                                                      5      427     15.99
                                                                      6        0       .00
                                                                      7        0       .00

 PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT        LEVEL             COUNT   PERCENT
       <                                    <                                      <
   . -  1.        134      1.25          . -  2.      1515     14.19              . -  200.      71       .66
  1. -  2.       2625     24.58         2. -  4.       273      2.56         200. -  400.      23       .22
  2. -  3.        949      8.89         4. -  6.       219      2.05         400. -  600.     882      8.26
  3. -  4.        485      4.54         6. -  8.       314      2.94         600. -  800.     945      8.85
  4. -  5.        250      2.34         8. - 10.       393      3.68         800. - 1000.     162      1.52
  5. -  6.        236      2.21        10. - 12.       259      2.43        1000. - 1200.     516      4.83
  6. -  7.        191      1.79        12. - 14.       292      2.73        1200. - 1400.     439      4.11
  7. -  8.        229      2.14        14. - 16.       637      5.96        1400. - 1600.     699      6.54
  8. -  9.        175      1.64        16. - 18.       638      5.97        1600. - 1800.     841      7.87
  9. - 10.        179      1.68        18. - 20.       706      6.61        1800. - 2000.    1178     11.03
 10. - 11.        109      1.02        20. - 22.       696      6.52        2000. - 2200.     834      7.81
 11. - 12.        121      1.13        22. - 24.       751      7.03        2200. - 2400.    1171     10.96
 12. - 13.         93       .87        24. - 26.       704      6.59        2400. - 2600.     601      5.63
 13. - 14.         92       .86        26. - 28.       671      6.28        2600. - 2800.     705      6.60
 14. - 15.         87       .81        28. - 30.       379      3.55        2800. - 3000.     764      7.15
 15. - 16.         87       .81        30. - 32.       544      5.09        3000. - 3200.     541      5.07
 16. - 17.        112      1.05        32. - 34.       481      4.50        3200. - 3400.     195      1.83
 17. - 18.        348      3.26        34. - 36.       134      1.25        3400. - 3600.      97       .91
 18. - 19.       1079     10.10        36. - 38.        28       .26        3600. - 3800.      16       .15
 19. - 20.        487      4.56        38. - 40.        16       .15        3800. - 4000.       0       .00
 20. - 21.        165      1.54        40. - 42.        25       .23        4000. - 4200.       0       .00
 21. - 22.        136      1.27        42. - 44.       109      1.02        4200. - 4400.       0       .00
 22. - 23.        151      1.41        44. - 46.       155      1.45        4400. - 4600.       0       .00
 23. - 24.        348      3.26        46. - 48.       235      2.20        4600. - 4800.       0       .00
 24. - 25.       1168     10.94        48. - 50.       183      1.71        4800. - 5000.       0       .00
 25. - 26.        642      6.01        50. - 52.       222      2.08
 26. - 27.          0       .00        52. - 54.        82       .77
 27. - 28.          0       .00        54. - 56.        15       .14
 28. - 29.          0       .00        56. - 58.         3       .03
 29. - 30.          0       .00        58. - 60.         1       .01
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 19.47 MIN, IDLE SPEED 500 RPM, 9/18/74 RUN 1

 VAR NO        MEAN          S.D.      S.E. OF MEAN  SAMPLE        MAXIMUM       MINIMUM        RANGE
RPM   1     1846.5015     884.8945        8.6439   10480       4965.0000       65.0000     4900.0000
MV    2       11.8130       8.4531         .0826   10480         29.4030       -2.9370       32.3400
SPD   3       23.5190      15.9531         .1558   10480         66.7367         .0000       66.7367
TP    4        4.7651        .5785         .0057   10480          9.1100         .0300        9.0800

                                    PERCENT OF TIME                 PERCENT OF TIME
                                    THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                    LEVEL          COUNT   PERCENT   GEAR    COUNT   PERCENT


                                    CLOSED            10       .10      1        0        .00
                                       WOT          3734     35.63      2        0        .00
                                                                        3        0        .00
                                                                        4        0        .00
                                                                        5        0        .00
                                                                        6        0        .00
                                                                        7        0        .00

PERCENT OF TIME  MV AT                PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT       LEVEL           COUNT   PERCENT       LEVEL              COUNT   PERCENT
          <                                     <                                     <
   . -  1.       1136     10.84          . -  2.       1552     14.81             . -  200.        4       .04
  1. -  2.        953      9.09         2. -  4.        267      2.38          200. -  400.      169      1.61
  2. -  3.        620      5.92         4. -  6.        236      2.25          400. -  600.      739      7.05
  3. -  4.        187      1.78         6. -  8.        170      1.62          600. -  800.     1005      9.59
  4. -  5.        220      2.10         8. - 10.        144      1.37          800. - 1000.      265      2.53
  5. -  6.        310      2.96        10. - 12.        260      2.48         1000. - 1200.      428      4.08
  6. -  7.        351      3.35        12. - 14.        199      1.90         1200. - 1400.      607      5.79
  7. -  8.        230      2.19        14. - 16.        347      3.31         1400. - 1600.      902      8.61
  8. -  9.        224      2.14        16. - 18.        615      5.87         1600. - 1800.     1118     10.67
  9. - 10.        258      2.46        18. - 20.        517      4.93         1800. - 2000.      736      7.02
 10. - 11.        251      2.40        20. - 22.        476      4.54         2000. - 2200.      941      8.98
 11. - 12.        235      2.24        22. - 24.        534      5.10         2200. - 2400.      567      5.41
 12. - 13.        225      2.15        24. - 26.        437      4.17         2400. - 2600.      739      7.05
 13. - 14.        223      2.13        26. - 28.        556      5.31         2600. - 2800.      503      4.80
 14. - 15.        234      2.23        28. - 30.        661      6.31         2800. - 3000.      408      3.89
 15. - 16.        368      3.51        30. - 32.        946      9.03         3000. - 3200.      773      7.38
 16. - 17.        613      5.85        32. - 34.        364      3.47         3200. - 3400.      174      1.66
 17. - 18.        719      6.86        34. - 36.        286      2.73         3400. - 3600.      138      1.32
 18. - 19.        293      2.80        36. - 38.        356      3.40         3600. - 3800.      138      1.32
 19. - 20.        171      1.63        38. - 40.        352      3.36         3800. - 4000.       89       .85
 20. - 21.        277      2.64        40. - 42.        133      1.27         4000. - 4200.       28       .27
 21. - 22.        417      3.98        42. - 44.         33       .31         4200. - 4400.        1       .01
 22. - 23.        649      6.19        44. - 46.         18       .17         4400. - 4600.        2       .02
 23. - 24.        832      7.94        46. - 48.         18       .17         4600. - 4800.        4       .04
 24. - 25.        324      3.09        48. - 50.         48       .46         4800. - 5000.        2       .02
 25. - 26.          5       .05        50. - 52.         74       .71
 26. - 27.          0       .00        52. - 54.         90       .86
 27. - 28.          0       .00        54. - 56.        288      2.75
 28. - 29.          2       .02        56. - 58.        354      3.38
 29. - 30.          2       .02        58. - 60.        130      1.24
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TRUCK G-7

1965 CHEVROLET 19500 LB GVW VAN
WITH 292 CID I6 ENGINE

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1965 CHEVROLET 80A VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 21.87 MIN, IDLE SPEED 500 RPM, 9/18/74 RUN 2

 VAR NO       MEAN        S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM    1   1412.3655   696.0378        6.4514   11640       3240.0000    245.0000   2995.0000
MV     2     12.4307     8.4132         .0780   11640         25.1790     -3.3000     28.4790
SPD    3     20.5367    14.8858         .1380   11640         53.4693       .0000     53.4693
TP     4      4.6957      .5033         .0047   11640          5.8300      4.0300      1.8000

                                   PERCENT OF TIME                   PERCENT OF TIME
                                   THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                   LEVEL         COUNT    PERCENT    GEAR     COUNT    PERCENT


                                   CLOSED            0        .00       1         0        .00
                                      WOT         3420      29.38       2         0        .00
                                                                        3         0        .00
                                                                        4         0        .00
                                                                        5         0        .00
                                                                        6         0        .00
                                                                        7         0        .00

PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
LEVEL             COUNT   PERCENT      LEVEL             COUNT   PERCENT      LEVEL               COUNT   PERCENT
         <                                      <                                      <
    . -  1.        1403     12.05          . -  2.        2173     18.67          . -  200.         0       .00
   1. -  2.         776      6.65         2. -  4.         280      2.41       200. -  400.       149      1.28
   2. -  3.         618      5.31         4. -  6.         400      3.44       400. -  600.      2153     18.50
   3. -  4.         308      2.65         6. -  8.         227      1.95       600. -  800.       523      4.49
   4. -  5.         220      1.89         8. - 10.         279      2.40       800. - 1000.       844      7.25
   5. -  6.         196      1.68        10. - 12.         331      2.84      1000. - 1200.       853      7.33
   6. -  7.         176      1.51        12. - 14.         474      4.07      1200. - 1400.      1193     10.25
   7. -  8.         200      1.72        14. - 16.         416      3.57      1400. - 1600.      1510     12.97
   8. -  9.         202      1.74        16. - 18.         511      4.39      1600. - 1800.      1323     11.37
   9. - 10.         268      2.30        18. - 20.         528      4.54      1800. - 2000.       889      7.64
  10. - 11.         235      2.02        20. - 22.         505      4.34      2000. - 2200.       441      3.79
  11. - 12.         205      1.76        22. - 24.         471      4.05      2200. - 2400.       295      2.53
  12. - 13.         225      1.93        24. - 26.         479      4.12      2400. - 2600.       566      4.86
  13. - 14.         246      2.11        26. - 28.         532      4.57      2600. - 2800.       492      4.23
  14. - 15.         281      2.41        28. - 30.         501      4.30      2800. - 3000.       390      3.35
  15. - 16.         575      4.94        30. - 32.         701      6.02      3000. - 3200.        18       .15
  16. - 17.        1089      9.36        32. - 34.         644      5.53      3200. - 3400.         1       .01
  17. - 18.         975      8.38        34. - 36.         541      4.65      3400. - 3600.         0       .00
  18. - 19.         246      2.11        36. - 38.         435      3.74      3600. - 3800.         0       .00
  19. - 20.         199      1.71        38. - 40.         103       .88      3800. - 4000.         0       .00
  20. - 21.         216      1.86        40. - 42.          37       .32      4000. - 4200.         0       .00
  21. - 22.         496      4.26        42. - 44.          88       .76      4200. - 4400.         0       .00
  22. - 23.         803      6.90        44. - 46.         216      1.86      4400. - 4600.         0       .00
  23. - 24.         937      8.05        46. - 48.         191      1.64      4600. - 4800.         0       .00
  24. - 25.         357      3.07        48. - 50.         280      2.41      4800. - 5000.         0       .00
  25. - 26.           3       .03        50. - 52.         282      2.42
  26. - 27.           0       .00        52. - 54.          15       .13
  27. - 28.           0       .00        54. - 56.           0       .00
  28. - 29.           0       .00        56. - 58.           0       .00
  29. - 30.           0       .00        58. - 60.           0       .00
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 19.07 MIN. IDLE SPEED 500 RPM, 9/18/74 RUN 3

 VAR NO       MEAN         S.D.      S.E. OF MEAN  SAMPLE       MAXIMUM       MINIMUM        RANGE
RPM   1    1663.4844     714.8099       7.0501   10280       3375.0000     355.0000     3020.0000
MV    2      13.1791       8.5574        .0844   10280         26.7300        .5610       26.1690
SPD   3      23.8182      14.4248        .1423   10280         57.4029        .0000       57.4029
TP    4       4.7048        .6242        .0062   10280          5.7600        .0000        5.7600

                                   PERCENT OF TIME                  PERCENT OF TIME
                                  THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                  LEVEL        COUNT   PERCENT     GEAR     COUNT   PERCENT

                                  CLOSED          68       .66        1         0       .00
                                     WOT        3288     31.98        2         0       .00
                                                                      3         0       .00
                                                                      4         0       .00
                                                                      5         0       .00
                                                                      6         0       .00
                                                                      7         0       .00

PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                   PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT         LEVEL           COUNT   PERCENT          LEVEL             COUNT   PERCENT
           <                                       <                                        <
    . -  1.       100       .97            . -  2.      1237     12.03                . -  200.        0       .00
   1. -  2.      1185     11.53           2. -  4.       176      1.71            200. -  400.        4       .04
   2. -  3.       926      9.01           4. -  6.       174      1.69            400. -  600.     1396     13.58
   3. -  4.       506      4.92           6. -  8.       163      1.59            600. -  800.      271      2.64
   4. -  5.       309      3.01           8. - 10.       190      1.85            800. - 1000.      264      2.57
   5. -  6.       231      2.25          10. - 12.       282      2.74           1000. - 1200.      711      6.92
   6. -  7.       137      1.33          12. - 14.       326      3.17           1200. - 1400.      846      8.23
   7. -  8.       162      1.58          14. - 16.       450      4.38           1400. - 1600.      932      9.07
   8. -  9.       222      2.16          16. - 18.       410      3.99           1600. - 1800.     1421     13.82
   9. - 10.       308      3.00          18. - 20.       523      5.09           1800. - 2000.     1567     15.24
  10. - 11.       260      2.53          20. - 22.       626      6.09           2000. - 2200.      824      8.02
  11. - 12.       237      2.31          22. - 24.       452      4.40           2200. - 2400.      253      2.46
  12. - 13.       179      1.74          24. - 26.       374      3.64           2400. - 2600.      266      2.59
  13. - 14.       213      2.07          26. - 28.       512      4.98           2600. - 2800.      628      6.11
  14. - 15.       250      2.43          28. - 30.       667      6.49           2800. - 3000.      751      7.31
  15. - 16.       186      1.81          30. - 32.       740      7.20           3000. - 3200.      137      1.33
  16. - 17.       500      4.86          32. - 34.       838      8.15           3200. - 3400.        9       .09
  17. - 18.       907      8.82          34. - 36.       546      5.31           3400. - 3600.        0       .00
  18. - 19.       471      4.58          36. - 38.       312      3.04           3600. - 3800.        0       .00
  19. - 20.       193      1.88          38. - 40.       104      1.01           3800. - 4000.        0       .00
  20. - 21.       158      1.54          40. - 42.        27       .26           4000  - 4200.        0       .00
  21. - 22.       168      1.63          42. - 44.        25       .24           4200. - 4400.        0       .00
  22. - 23.       404      3.93          44. - 46.        43       .42           4400. - 4600.        0       .00
  23. - 24.       702      6.83          46. - 48.       103      1.00           4600. - 4800.        0       .00
  24. - 25.       872      8.48          48. - 50.       426      4.14           4800. - 5000.        0       .00
  25. - 26.       478      4.65          50. - 52.       419      4.08
  26. - 27.        16       .16          52. - 54.       129      1.25
  27. - 28.         0       .00          54. - 56.         5       .05
  28. - 29.         0       .00          56. - 58.         1       .01
  29. - 30.         0       .00          58. - 60.         0       .00
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 19.84 MIN, IDLE SPEED 500 RPM, 9/18/74 RUN 4

 VAR NO       MEAN         S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1738.4185     733.0618       7.1067   10640      4675.0000     155.0000    4520.0000
MV    2      12.9749       8.4265        .0817   10640        26.0040        .5940      25.4100
SPD   3      23.0124      14.1111        .1368   10640        55.0694        .0000      55.0694
TP    4       4.7488        .4984        .0048   10640         5.7000       4.0100       1.6900

                                   PERCENT OF TIME                   PERCENT OF TIME
                                   THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                   LEVEL          COUNT   PERCENT    GEAR    COUNT   PERCENT

                                   CLOSED            0       .00        1        0       .00
                                      WOT         3613     33.96        2        0       .00
                                                                        3        0       .00
                                                                        4        0       .00
                                                                        5        0       .00
                                                                        6        0       .00
                                                                        7        0       .00

PERCENT OF TIME  MV AT              PERCENT OF TIME  MS AT               PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT       LEVEL             COUNT   PERCENT
        <                                   <                                    <
   . -  1.       246      2.31         . -  2.      1330     12.50            . -  200.        1       .01
  1. -  2.      1341     12.60        2. -  4.       179      1.68         200. -  400.        5       .05
  2. -  3.       791      7.43        4. -  6.       270      2.54         400. -  600.     1414     13.29
  3. -  4.       388      3.65        6. -  8.       225      2.11         600. -  800.      248      2.33
  4. -  5.       287      2.70        8. - 10.       220      2.07         800. - 1000.      222      2.09
  5. -  6.       223      2.10       10. - 12.       230      2.16        1000. - 1200.      357      3.36
  6. -  7.       183      1.72       12. - 14.       316      2.97        1200. - 1400.      734      6.90
  7. -  8.       235      2.21       14. - 16.       384      3.61        1400. - 1600.     1068     10.04
  8. -  9.       246      2.31       16. - 18.       340      3.20        1600. - 1800.     1633     15.35
  9. - 10.       223      2.10       18. - 20.       441      4.14        1800. - 2000.     1328     12.48
 10. - 11.       250      2.35       20. - 22.       711      6.68        2000. - 2200.     1011      9.50
 11. - 12.       290      2.73       22. - 24.       713      6.70        2200. - 2400.      621      5.84
 12. - 13.       300      2.82       24. - 26.       587      5.52        2400. - 2600.      402      3.78
 13. - 14.       262      2.46       26. - 28.       617      5.80        2600. - 2800.      710      6.67
 14. - 15.       240      2.26       28. - 30.       876      8.23        2800. - 3000.      616      5.79
 15. - 16.       255      2.40       30. - 32.       661      6.21        3000. - 3200.      101       .95
 16. - 17.       506      4.76       32. - 34.       516      4.85        3200. - 3400.       61       .57
 17. - 18.       896      8.42       34. - 36.       551      5.18        3400. - 3600.       34       .32
 18. - 19.       538      5.06       36. - 38.       203      1.91        3600. - 3800.       33       .31
 19. - 20.       247      2.32       38. - 40.       118      1.11        3800. - 4000.       27       .25
 20. - 21.       183      1.72       40. - 42.        62       .58        4000. - 4200.       12       .11
 21. - 22.       223      2.10       42. - 44.        37       .35        4200. - 4400.        1       .01
 22. - 23.       358      3.36       44. - 46.        76       .71        4400. - 4600.        0       .00
 23. - 24.       729      6.85       46. - 48.       186      1.75        4600. - 4800.        1       .01
 24. - 25.       861      8.09       48. - 50.       414      3.89        4800. - 5000.        0       .00
 25. - 26.       337      3.17       50. - 52.       291      2.73
 26. - 27.         2       .02       52. - 54.        80       .75
 27. - 28.         0       .00       54. - 56.         6       .06
 28. - 29.         0       .00       56. - 58.         0       .00
 29. - 30.         0       .00       58. - 60.         0       .00
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 19.66 MIN, IDLE SPEED 500 RPM, 9/18/74 RUN 5

 VAR NO        MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1     1645.4233     667.9078        6.5494  10400        3360.0000     170.0000   3190.0000
MV    2       12.9733       8.7115         .0854  10400          25.8060        .5960     25.2120
SPD   3       23.2244      13.6698         .1340  10400          53.3360        .0000     53.3360
TP    4        4.7630        .5272         .0052  10400           5.7000       3.9600      1.7400

                                    PERCENT OF TIME                 PERCENT OF TIME
                                   THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                   LEVEL         COUNT   PERCENT    GEAR     COUNT   PERCENT

                                   CLOSED            0       .00       1         0       .00
                                      WOT         3550     34.13       2       425     16.35
                                                                       3        40      1.54
                                                                       4       275     10.50
                                                                       5         0       .00
                                                                       6         0       .00
                                                                       7         0       .00

 PERCENT OF TIME  MV AT.               PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT         LEVEL           COUNT   PERCENT
          <                                     <                                      <
   . -  1.        271      2.61          . -  2.       1525     14.66            . -  200.        2       .02
  1. -  2.       1724     16.58         2. -  4.        165      1.59         200. -  400.       11       .11
  2. -  3.        694      6.67         4. -  6.        140      1.35         400. -  600.     1657     15.93
  3. -  4.        288      2.77         6. -  8.        143      1.37         600. -  800.      230      2.21
  4. -  5.        221      2.12         8. - 10.        155      1.49         800. - 1000.      146      1.40
  5. -  6.        215      2.07        10. - 12.        144      1.38        1000. - 1200.      280      2.69
  6. -  7.        203      1.95        12. - 14.        189      1.82        1200. - 1400.      520      5.00
  7. -  8.        158      1.52        14. - 16.        271      2.61        1400. - 1600.     1046     10.06
  8. -  9.        141      1.36        16. - 18.        452      4.35        1600. - 1800.     2071     19.91
  9. - 10.        167      1.61        18. - 20.        446      4.29        1800. - 2000.     1754     16.87
 10. - 11.        225      2.16        20. - 22.        505      4.86        2000. - 2200.      693      6.66
 11. - 12.        190      1.83        22. - 24.        540      5.19        2200. - 2400.      491      4.72
 12. - 13.        165      1.59        24. - 26.        523      5.03        2400. - 2600.      584      5.62
 13. - 14.        203      1.95        26. - 28.        752      7.23        2600. - 2800.      611      5.87
 14. - 15.        215      2.07        28. - 30.       1014      9.75        2800. - 3000.      271      2.61
 15. - 16.        269      2.59        30. - 32.        708      6.81        3000. - 3200.       26       .25
 16. - 17.        535      5.14        32. - 34.        921      8.86        3200. - 3400.        7       .07
 17. - 18.        988      9.50        34. - 36.        550      5.29        3400. - 3600.        0       .00
 18. - 19.        581      5.59        36. - 38.        140      1.35        3600. - 3800.        0       .00
 19. - 20.        182      1.75        38. - 40.         70       .67        3800. - 4000.        0       .00
 20. - 21.        255      2.45        40. - 42.        106      1.02        4000. - 4200.        0       .00
 21. - 22.        209      2.01        42. - 44.        135      1.30        4200. - 4400.        0       .00
 22. - 23.        270      2.60        44. - 46.        175      1.68        4400. - 4600.        0       .00
 23. - 24.        733      7.05        46. - 48.        320      3.08        4600. - 4800.        0       .00
 24. - 25.       1061     10.20        48. - 50.        224      2.15        4800. - 5000.        0       .00
 25. - 26.        237      2.28        50. - 52.         69       .66
 26. - 27.          0       .00        52. - 54.         18       .17
 27. - 28.          0       .00        54. - 56.          0       .00
 28. - 29.          0       .00        56. - 58.          0       .00
 29. - 30.          0       .00        58. - 60.          0       .00
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, [illegible] LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 18.30 MIN, IDLE SPEED 500 RPM, 7/18/74 RUN 8

 VAR NO       MEAN          S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM        RANGE
RPM    1   1699.6042     715.6095       7.2586     9720      3375.0000     225.0000    3100.0000
MV     2     11.7345       7.5345        .0766     9720        25.1460      -.5960      25.7400
SPD    3     25.1649      14.2014        .1440     9720        58.6696       .0000      58.6696
TP     4      4.7865        .4167        .0042     9720         5.6300      4.0000       1.6300

                              PERCENT OF TIME                  PERCENT OF TIME
                              THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                              LEVEL         COUNT   PERCENT    GEAR     COUNT   PERCENT


                              CLOSED            0       .00       1         0       .00
                                 WOT         2792     28.72       2       380     15.64
                                                                  3       690     28.40
                                                                  4      1360     55.97
                                                                  5         0       .00
                                                                  6         0       .00
                                                                  7         0       .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT        LEVEL            COUNT   PERCENT
       <                                    <                                       <
   . -  1.       263      2.71          . -  2.       836      8.60            . -  200.       0       .00
  1. -  2.       820      8.44         2. -  4.       140      1.44         200. -  400.      79       .81
  2. -  3.       530      5.45         4. -  6.       157      1.62         400. -  600.    1144     11.77
  3. -  4.       504      5.19         6. -  8.       201      2.07         600. -  800.     128      1.32
  4. -  5.       384      3.95         8. - 10.       259      2.66         800. - 1000.     187      1.92
  5. -  6.       370      3.81        10. - 12.       182      1.87        1000. - 1200.     437      4.50
  6. -  7.       435      4.48        12. - 14.       244      2.51        1200. - 1400.    1189     12.23
  7. -  8.       335      3.45        14. - 16.       359      3.69        1400. - 1600.    1169     12.03
  8. -  9.       291      2.99        16. - 18.       331      3.41        1600. - 1800.    1169     12.03
  9. - 10.       359      3.69        18. - 20.       463      4.76        1800. - 2000.    1156     11.89
 10. - 11.       368      3.79        20. - 22.       471      4.85        2000. - 2200.     782      8.05
 11. - 12.       384      3.95        22. - 24.       729      7.50        2200. - 2400.     455      4.68
 12. - 13.       435      4.48        24. - 26.       774      7.96        2400. - 2600.     359      3.69
 13. - 14.       246      2.53        26. - 28.       644      6.63        2600. - 2800.     723      7.44
 14. - 15.       263      2.71        28. - 30.       598      6.15        2800. - 3000.     501      5.15
 15. - 16.       546      5.62        30. - 32.       453      4.66        3000. - 3200.     227      2.34
 16. - 17.       768      7.90        32. - 34.       677      6.97        3200. - 3400.      15       .15
 17. - 18.       231      2.38        34. - 36.       341      3.51        3400. - 3600.       0       .00
 18. - 19.       161      1.66        36. - 38.       428      4.40        3600. - 3800.       0       .00
 19. - 20.       101      1.04        38. - 40.       232      2.39        3800. - 4000.       0       .00
 20. - 21.       137      1.41        40. - 42.        82       .84        4000. - 4200.       0       .00
 21. - 22.       213      2.19        42. - 44.        25       .26        4200. - 4400.       0       .00
 22. - 23.       537      5.52        44. - 46.        16       .16        4400. - 4600.       0       .00
 23. - 24.       641      6.59        46. - 48.        44       .45        4600. - 4800.       0       .00
 24. - 25.       362      3.72        48. - 50.       254      2.61        4800. - 5000.       0       .00
 25. - 26.        10       .10        50. - 52.       324      3.33
 26. - 27.         0       .00        52. - 54.       193      1.99
 27. - 28.         0       .00        54. - 56.       189      1.94
 28. - 29.         0       .00        56. - 58.        69       .71
 29. - 30.         0       .00        58. - 60.         5       .05
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1965 CHEVROLET BOX VAN WITH 292 CID I-6, 19500 LB GVW, TEST WT 14850 TRUCK G-7
RUN DURATION 17.48 MIN, IDLE SPEED 500 RPM, 9/19/74 RUN 9

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM        RANGE
RPM   1    1655.7021     614.1744       6.3893     9240       3150.0000     300.0000     2850.0000
MV    2      11.6428       7.4935        .0700     9240         25.0800        .1980       24.8820
SPD   3      26.4706      12.7600        .1327     9240         54.5361        .0000       54.5361
TP    4       4.6854         3598        .0037     9240          5.4300       4.0200        1.4100

                                    PERCENT OF TIME                     PERCENT OF TIME
                                   THROTTLE POSITION AT                GEAR SHIFT POSITION AT
                                   LEVEL          COUNT    PERCENT     GEAR     COUNT   PERCENT

                                   CLOSED             0        .00        1         0       .00
                                      WOT          2191      23.71        2       265     11.47
                                                                          3       355     15.37
                                                                          4      1689     73.12
                                                                          5         0       .00
                                                                          6         0       .00
                                                                          7         0       .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT               PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT      LEVEL           COUNT   PERCENT      LEVEL            COUNT   PERCENT
         <                                    <                                    <
   . -  1.        234      2.53         . -  2.        477      5.16          . -  200.        0       .00
  1. -  2.        377      4.08        2. -  4.         91       .98       200. -  400.       51       .55
  2. -  3.        651      7.05        4. -  6.        135      1.46       400. -  600.      653      7.07
  3. -  4.        645      6.98        6. -  8.        176      1.90       600. -  800.      145      1.57
  4. -  5.        564      6.10        8. - 10.        135      1.46       800. - 1000.      307      3.32
  5. -  6.        423      4.58       10. - 12.        154      1.67      1000. - 1200.      728      7.88
  6. -  7.        441      4.77       12. - 14.        344      3.72      1200. - 1400.     1210     13.10
  7. -  8.        335      3.63       14. - 16.        322      3.48      1400. - 1600.     1241     13.43
  8. -  9.        297      3.21       16. - 18.        356      3.85      1600. - 1800.     1417     15.34
  9. - 10.        327      3.54       18. - 20.        454      4.91      1800. - 2000.     1298     14.05
 10. - 11.        381      4.12       20. - 22.        463      5.01      2000. - 2200.      503      5.44
 11. - 12.        306      3.31       22. - 24.        488      5.28      2200. - 2400.      343      3.71
 12. - 13.        359      3.89       24. - 26.        598      6.47      2400. - 2600.      277      3.00
 13. - 14.        425      4.60       26. - 28.        627      6.79      2600. - 2800.      763      8.26
 14. - 15.        312      3.38       28. - 30.        625      6.76      2800. - 3000.      284      3.07
 15. - 16.        426      4.61       30. - 32.        976     10.56      3000. - 3200.       20       .22
 16. - 17.        397      4.30       32. - 34.        773      8.37      3200. - 3400.        0       .00
 17. - 18.        227      2.46       34. - 36.        478      5.17      3400. - 3600.        0       .00
 18. - 19.         93      1.01       36. - 38.        307      3.32      3600. - 3800.        0       .00
 19. - 20.        162      1.75       38. - 40.         79       .85      3800. - 4000.        0       .00
 20. - 21.        150      1.52       40. - 42.         34       .37      4000. - 4200.        0       .00
 21. - 22.        201      2.18       42. - 44.         84       .91      4200. - 4400.        0       .00
 22. - 23.        394      4.26       44. - 46.         41       .44      4400. - 4600.        0       .00
 23. - 24.        685      7.41       46. - 48.        170      1.84      4600. - 4800.        0       .00
 24. - 25.        424      4.59       48. - 50.        380      4.11      4800. - 5000.        0       .00
 25. - 26.          4       .04       50. - 52.        397      4.30
 26. - 27.          0       .00       52. - 54.         74       .80
 27. - 28.          0       .00       54  - 56.          2       .02
 28. - 29.          0       .00       56. - 58.          0       .00
 29. - 30.          0       .00       58. - 60.          0       .00
```

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1965 CHEVROLET BOX VAN WITH 292 CID I-6. 19500 LB GVW. TEST WT 14850 TRUCK G-7
RUN DURATION 17.05 MIN. IDLE SPEED 500 RPM. 9/19/74 RUN 10

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1713.5933    680.8112       7.1764     9000       3295.0000    310.0000    2985.0000
MV    2      11.4773      7.5946        .0801     9000         25.2780     -1.2540      26.5320
SPD   3      27.1570     14.7333        .1553     9000         57.8696       .0000      57.8696
TP    4       4.7130       .4086        .0043     9000          5.6500      4.0000       1.6500

                                 PERCENT OF TIME                  PERCENT OF TIME
                                 THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT     GEAR    COUNT   PERCENT

                                 CLOSED           0       .00        1        0       .00
                                    WOT        2418     26.87        2      327     14.53
                                                                     3      361     16.04
                                                                     4     1562     69.42
                                                                     5        0       .00
                                                                     6        0       .00
                                                                     7        0       .00

PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT       LEVEL           COUNT   PERCENT        LEVEL            COUNT   PERCENT
       <                                    <                                       <
  . -  1.        491      5.46          . -  2.        736      8.18            . -  200.        0       .00
 1. -  2.        689      7.66         2. -  4.        118      1.31         200. -  400.       83       .92
 2. -  3.        474      5.27         4. -  6.        167      1.86         400. -  600.      812      9.02
 3. -  4.        395      4.39         6. -  8.        220      2.44         600. -  800.       91      1.01
 4. -  5.        417      4.63         8. - 10.        124      1.38         800. - 1000.      118      1.31
 5. -  6.        402      4.47        10. - 12.        107      1.19        1000. - 1200.      540      6.00
 6. -  7.        325      3.61        12. - 14.        208      2.31        1200. - 1400.     1092     12.13
 7. -  8.        285      3.17        14. - 16.        266      2.96        1400. - 1600.     1449     16.10
 8. -  9.        314      3.49        16. - 18.        233      2.59        1600. - 1800.      888      9.87
 9. - 10.        303      3.37        18. - 20.        411      4.57        1800. - 2000.      983     10.92
10. - 11.        315      3.50        20. - 22.        412      4.58        2000. - 2200.     1027     11.41
11. - 12.        330      3.67        22. - 24.        495      5.50        2200. - 2400.      469      5.21
12. - 13.        299      3.32        24. - 26.        684      7.60        2400. - 2600.      197      2.19
13. - 14.        355      3.94        26. - 28.        675      7.50        2600. - 2800.      364      4.04
14. - 15.        379      4.21        28. - 30.        398      4.42        2800. - 3000.      737      8.19
15. - 16.        520      5.78        30. - 32.        281      3.12        3000. - 3200.      136      1.51
16. - 17.        484      5.38        32. - 34.        353      3.92        3200. - 3400.       14       .16
17. - 18.        278      3.09        34. - 36.        461      5.12        3400. - 3600.        0       .00
18. - 19.        156      1.73        36. - 38.        721      8.01        3600. - 3800.        0       .00
19. - 20.        143      1.59        38. - 40.        442      4.91        3800. - 4000.        0       .00
20. - 21.        125      1.39        40. - 42.        162      1.80        4000. - 4200.        0       .00
21. - 22.        152      1.69        42. - 44.        166      1.84        4200. - 4400.        0       .00
22. - 23.        404      4.49        44. - 46.         71       .79        4400. - 4600.        0       .00
23. - 24.        560      6.22        46. - 48.         35       .39        4600. - 4800.        0       .00
24. - 25.        381      4.23        48. - 50.        144      1.60        4800. - 5000.        0       .00
25. - 26.         18       .20        50. - 52.        371      4.12
26. - 27.          0       .00        52. - 54.        376      4.18
27. - 28.          0       .00        54. - 56.        102      1.13
28. - 29.          0       .00        56. - 58.         61       .68
29. - 30.          0       .00        58. - 60.          0       .00
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TRUCK G-8

1965 GMC 19500 LB GVW VAN
WITH 351 CID V6 ENGINE

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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB, GVW, TEST WT, 16000 LB. TRUCK G-8
RUN DURATION 22.98 MIN., IDLE SPEED      RPM, 10/02/74 RUN 5

 VAR NO       MEAN          S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM        RANGE
RPM  1     1350.7576     431.6091      16.3955      693      2300.0000     400.0000    1900.0000
MV   2       12.7727       8.6191        .3274      693        25.2450      -2.3100      27.5550
SPD  3       14.2841      12.0148        .4564      693        43.0160        .1613      42.8547

   PERCENT OF TIME  MV AT                   PERCENT OF TIME  MB AT                   PERCENT OF TIME RPM AT
   LEVEL            COUNT   PERCENT          LEVEL            COUNT   PERCENT          LEVEL              COUNT   PERCENT
        <                                          <                                        <
   U -   1           28       4.04           0 -   2          101     14.57             0 -   200           0      0.00
   1 -   2           93      13.42           2 -   4           15      2.16           200 -   400           0      0.00
   2 -   3           26       3.75           4 -   6           20      2.89           400 -   600          12      1.73
   3 -   4           26       3.75           6 -   8           17      2.45           600 -   800          97     14.00
   4 -   5           41       5.92           8 -  10           34      4.91           800 -  1000          70     10.10
   5 -   6           23       3.32          10 -  12           23      3.32          1000 -  1200          53      7.65
   6 -   7           24       3.46          12 -  14           25      3.61          1200 -  1400         120     17.32
   7 -   8           15       2.16          14 -  16           26      3.75          1400 -  1600         142     20.49
   8 -   9           11       1.59          16 -  18           19      2.74          1600 -  1800          70     10.10
   9 -  10           18       2.60          18 -  20           33      4.76          1800 -  2000          44      6.35
  10 -  11           13       1.88          20 -  22           29      4.18          2000 -  2200          79     11.40
  11 -  12           12       1.73          22 -  24           72     10.39          2200 -  2400           6       .87
  12 -  13            9       1.30          24 -  26           77     11.11          2400 -  2600           0      0.00
  13 -  14            9       1.30          26 -  28           68      9.81          2600 -  2800           0      0.00
  14 -  15           14       2.02          28 -  30           49      7.07          2800 -  3000           0      0.00
  15 -  16            3        .43          30 -  32            6       .87          3000 -  3200           0      0.00
  16 -  17           19       2.74          32 -  34            3       .43          3200 -  3400           0      0.00
  17 -  18            4        .58          34 -  36            2       .29          3400 -  3600           0      0.00
  18 -  19           19       2.74          36 -  38            2       .29          3600 -  3800           0      0.00
  19 -  20           39       5.63          38 -  40           22      3.17          3800 -  4000           0      0.00
  20 -  21           95      13.71          40 -  42           44      6.35          4000 -  4200           0      0.00
  21 -  22           32       4.62          42 -  44            6       .87          4200 -  4400           0      0.00
  22 -  23           36       5.19          44 -  46            0      0.00          4400 -  4600           0      0.00
  23 -  24           52       7.50          46 -  48            0      0.00          4600 -  4800           0      0.00
  24 -  25           26       3.75          48 -  50            0      0.00          4800 -  5000           0      0.00
  25 -  26            5        .72          50 -  52            0      0.00
  26 -  27            0       0.00          52 -  54            0      0.00
  27 -  28            0       0.00          54 -  56            0      0.00
  28 -  29            0       0.00          56 -  58            0      0.00
  29 -  30            0       0.00          58 -  60            0      0.00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB. GVW, TEST WT. 16000 LB. TRUCK G-8
RUN DURATION 21.77 MIN., IDLE SPEED       RPM, 10/02/74 RUN 8

 VAR NO      MEAN         S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM      RANGE
RPM  1    1481.0186    475.2190      18.6684     648       2350.0000    300.0000    2050.0000
MV   2      11.5790      8.8671        .3483     648         25.2450       .4950      24.7500
SPD  3      20.2114     11.3681        .4466     648         47.0487       .2689      46.7799

   PERCENT OF TIME  MV AT               PERCENT OF TIME  MS AT              PERCENT OF TIME RPM AT
   LEVEL          COUNT   PERCENT        LEVEL          COUNT   PERCENT       LEVEL           COUNT   PERCENT
       <                                     <                                     <
   0 -   1           5       .77         0 -   2          63      9.72          0 -   200        0      0.00
   1 -   2          57      8.80         2 -   4          11      1.70        200 -   400        1       .15
   2 -   3         139     21.45         4 -   6          12      1.85        400 -   600       25      3.86
   3 -   4          55      8.49         6 -   8          20      3.09        600 -   800       58      8.95
   4 -   5          22      3.40         8 -  10          21      3.24        800 -  1000       30      4.63
   5 -   6          10      1.54        10 -  12          27      4.17       1000 -  1200       42      6.48
   6 -   7          16      2.47        12 -  14          36      5.56       1200 -  1400       86     13.27
   7 -   8           7      1.08        14 -  16          23      3.55       1400 -  1600      128     19.75
   8 -   9          10      1.54        16 -  18          44      6.79       1600 -  1800       97     14.97
   9 -  10          14      2.16        18 -  20          49      7.56       1800 -  2000       63      9.72
  10 -  11           8      1.23        20 -  22          44      6.79       2000 -  2200       91     14.04
  11 -  12           8      1.23        22 -  24          61      9.41       2200 -  2400       27      4.17
  12 -  13           4       .62        24 -  26          36      5.56       2400 -  2600        0      0.00
  13 -  14          12      1.85        26 -  28          64      9.88       2600 -  2800        0      0.00
  14 -  15           8      1.23        28 -  30          46      7.10       2800 -  3000        0      0.00
  15 -  16           3       .46        30 -  32           8      1.23       3000 -  3200        0      0.00
  16 -  17           7      1.08        32 -  34           0      0.00       3200 -  3400        0      0.00
  17 -  18          11      1.70        34 -  36          13      2.01       3400 -  3600        0      0.00
  18 -  19          27      4.17        36 -  38          19      2.93       3600 -  3800        0      0.00
  19 -  20          57      8.80        38 -  40          16      2.47       3800 -  4000        0      0.00
  20 -  21          21      3.24        40 -  42           3       .46       4000 -  4200        0      0.00
  21 -  22          19      2.93        42 -  44          21      3.24       4200 -  4400        0      0.00
  22 -  23          32      4.94        44 -  46           9      1.39       4400 -  4600        0      0.00
  23 -  24          57      8.80        46 -  48           2       .31       4600 -  4800        0      0.00
  24 -  25          36      5.56        48 -  50           0      0.00       4800 -  5000        0      0.00
  25 -  26           3       .46        50 -  52           0      0.00
  26 -  27           0      0.00        52 -  54           0      0.00
  27 -  28           0      0.00        54 -  56           0      0.00
  28 -  29           0      0.00        56 -  58           0      0.00
  29 -  30           0      0.00        58 -  60           0      0.00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB. GVW, TEST WT. 16000 LB. TRUCK G-8
RUN DURATION 21.77 MIN., IDLE SPEED       RPM, 10/02/74 RUN 8

 VAR NO        MEAN          S.D.      S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM  1     1481.0186      475.2190       18.6684      648        2350.0000     300.0000    2050.0000
MV   2       11.5790        8.8671         .3483      648          25.2450        .4950      24.7500
SPD  3       20.2119       11.3681         .4466      648          47.0487        .2689      46.7799

  PERCENT OF TIME  MV AT              PERCENT OF TIME  MB AT              PERCENT OF TIME RPM AT
  LEVEL          COUNT  PERCENT        LEVEL          COUNT  PERCENT        LEVEL          COUNT   PERCENT
        <                                   <                                   <
   0 -   1         5       .77          0 -   2        63      9.72          0 -   200        0      0.00
   1 -   2        57      8.80          2 -   4        11      1.70        200 -   400        1       .15
   2 -   3       139     21.45          4 -   6        12      1.85        400 -   600       25      3.86
   3 -   4        55      8.49          6 -   8        20      3.09        600 -   800       58      8.95
   4 -   5        22      3.40          8 -  10        21      3.24        800 -  1000       30      4.63
   5 -   6        10      1.54         10 -  12        27      4.17       1000 -  1200       42      6.48
   6 -   7        16      2.47         12 -  14        36      5.56       1200 -  1400       86     13.27
   7 -   8         7      1.08         14 -  16        23      3.55       1400 -  1600      128     19.75
   8 -   9        10      1.54         16 -  18        44      6.79       1600 -  1800       97     14.97
   9 -  10        14      2.16         18 -  20        49      7.56       1800 -  2000       63      9.72
  10 -  11         8      1.23         20 -  22        44      6.79       2000 -  2200       91     14.04
  11 -  12         8      1.23         22 -  24        61      9.41       2200 -  2400       27      4.17
  12 -  13         4       .62         24 -  26        36      5.56       2400 -  2600        0      0.00
  13 -  14        12      1.85         26 -  28        64      9.88       2600 -  2800        0      0.00
  14 -  15         8      1.23         28 -  30        46      7.10       2800 -  3000        0      0.00
  15 -  16         3       .46         30 -  32         8      1.23       3000 -  3200        0      0.00
  16 -  17         7      1.08         32 -  34         0      0.00       3200 -  3400        0      0.00
  17 -  18        11      1.70         34 -  36        13      2.01       3400 -  3600        0      0.00
  18 -  19        27      4.17         36 -  38        19      2.93       3600 -  3800        0      0.00
  19 -  20        57      8.80         38 -  40        16      2.47       3800 -  4000        0      0.00
  20 -  21        21      3.24         40 -  42         3       .46       4000 -  4200        0      0.00
  21 -  22        19      2.93         42 -  44        21      3.24       4200 -  4400        0      0.00
  22 -  23        32      4.94         44 -  46         9      1.39       4400 -  4600        0      0.00
  23 -  24        57      8.80         46 -  48         2       .31       4600 -  4800        0      0.00
  24 -  25        36      5.56         48 -  50         0      0.00       4800 -  5000        0      0.00
  25 -  26         3       .46         50 -  52         0      0.00
  26 -  27         0      0.00         52 -  54         0      0.00
  27 -  28         0      0.00         54 -  56         0      0.00
  28 -  29         0      0.00         56 -  58         0      0.00
  29 -  30         0      0.00         58 -  60         0      0.00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB GVW, TEST WT. 16000 LB, TRUCK G-8
RUN DURATION 21.75 MIN, IDLE SPEED 550 RPM 10/3/74 RUN 9

 VAR NO        MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1301.6594    415.6448        4.0524   10520        2145.0000    270.0000    1875.0000
MV    2      13.4504      8.7216         .0850   10520          27.3240      2.5410      24.7830
SPD   3      20.3803     10.8466         .1058   10520          50.3287       .0000      50.3287
TP    4       1.8485      1.9520         .0190   10520           5.3900       .0000       5.3900

                                      PERCENT OF TIME                   PERCENT OF TIME
                                     THROTTLE POSITION AT               GEAR SHIFT POSITION AT
                                     LEVEL          COUNT    PERCENT    GEAR     COUNT    PERCENT


                                     CLOSED          4414      41.96        1        24        .91
                                        WOT           836       7.95        2       504      19.16
                                                                            3       760      28.90
                                                                            4      1018      38.71
                                                                            5       323      12.28
                                                                            6         0        .00
                                                                            7         1        .04

PERCENT OF TIME  MV AT                PERCENT OF TIME  MS AT                  PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT       LEVEL           COUNT   PERCENT         LEVEL             COUNT   PERCENT
        <                                     <                                        <
   . -  1.          0       .00          . -  2.        898      8.54             . -  200.        0       .00
  1. -  2.          0       .00         2. -  4.        182      1.73          200. -  400.      246      2.34
  2. -  3.        496      4.71         4. -  6.        193      1.83          400. -  600.      458      4.35
  3. -  4.       1092     10.38         6. -  8.        218      2.07          600. -  800.      881      8.37
  4. -  5.       1431     13.60         8. - 10.        269      2.56          800. - 1000.      545      5.18
  5. -  6.        632      6.01        10. - 12.        349      3.32         1000. - 1200.     1726     16.41
  6. -  7.        435      4.13        12. - 14.        446      4.24         1200. - 1400.     2226     21.16
  7. -  8.        298      2.83        14. - 16.        481      4.57         1400. - 1600.     2131     20.26
  8. -  9.        341      3.24        16. - 18.        756      7.19         1600. - 1800.      829      7.88
  9. - 10.        277      2.63        18. - 20.        880      8.37         1800. - 2000.     1227     11.66
 10. - 11.        254      2.41        20. - 22.       1031      9.80         2000. - 2200.      251      2.39
 11. - 12.        183      1.74        22. - 24.       1367     12.99         2200. - 2400.        0       .00
 12. - 13.        121      1.15        24. - 26.       1076     10.23         2400. - 2600.        0       .00
 13. - 14.        149      1.42        26. - 28.        604      5.74         2600. - 2800.        0       .00
 14. - 15.        127      1.21        28. - 30.        323      3.07         2800. - 3000.        0       .00
 15. - 16.        119      1.13        30. - 32.        148      1.41         3000. - 3200.        0       .00
 16. - 17.        128      1.22        32. - 34.         40       .38         3200. - 3400.        0       .00
 17. - 18.        121      1.15        34. - 36.         54       .51         3400. - 3600.        0       .00
 18. - 19.        134      1.27        36. - 38.        173      1.64         3600. - 3800.        0       .00
 19. - 20.        352      3.35        38. - 40.        339      3.22         3800. - 4000.        0       .00
 20. - 21.        315      2.99        40. - 42.        367      3.49         4000. - 4200.        0       .00
 21. - 22.        898      8.54        42. - 44.        222      2.11         4200. - 4400.        0       .00
 22. - 23.        408      3.88        44. - 46.         79       .75         4400. - 4600.        0       .00
 23. - 24.        438      4.16        46. - 48.         19       .18         4600. - 4800.        0       .00
 24. - 25.        614      5.84        48. - 50.          5       .05         4800. - 5000.        0       .00
 25. - 26.        622      5.91        50. - 52.          1       .01
 26. - 27.        345      3.28        52. - 54.          0       .00
 27. - 28.        190      1.81        54. - 56.          0       .00
 28. - 29.          0       .00        56. - 58.          0       .00
 29. - 30.          0       .00        58. - 60.          0       .00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB GVW, TEST WT. 16000 LB. TRUCK G-8
RUN DURATION 24.66 MIN, IDLE SPEED 550 RPM 10/3/74 RUN 10

 VAR NO       MEAN          S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1    1270.6758     418.2357       3.8053   12080       2125.0000    225.0000    1900.0000
MV    2      15.5563       8.1117        .0738   12080         28.1160      3.5310      24.5850
SPD   3      17.7749      11.5583        .1052   12080         46.5110       .0000      46.5110
TP    4       1.4521       1.7289        .0157   12080          5.3100       .0000       5.3100

                               PERCENT OF TIME                  PERCENT OF TIME
                              THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                              LEVEL         COUNT   PERCENT    GEAR     COUNT   PERCENT

                              CLOSED         5603     46.38       1         0       .00
                                 WOT          254      2.10       2       663     21.95
                                                                  3       664     21.99
                                                                  4      1343     44.47
                                                                  5       349     11.56
                                                                  6         0       .00
                                                                  7         1       .03

PERCENT OF TIME  MV AT                 PERCENT OF TIME  WS AT                 PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT         LEVEL          COUNT   PERCENT         LEVEL           COUNT   PERCENT
         <                                      <                                     <
   .  -  1.        0       .00            .  -  2.     1793     14.84              .  -  200.       0       .00
  1.  -  2.        0       .00           2.  -  4.      265      2.19          200.  -  400.      184      1.52
  2.  -  3.        0       .00           4.  -  6.      290      2.40          400.  -  600.      325      2.69
  3.  -  4.      315      2.61           6.  -  8.      396      3.28          600.  -  800.     1805     14.94
  4.  -  5.     1172      9.70           8.  - 10.      504      4.17          800.  - 1000.      582      4.82
  5.  -  6.      737      6.10          10.  - 12.      578      4.78         1000.  - 1200.     1788     14.80
  6.  -  7.      911      7.54          12.  - 14.      478      3.96         1200.  - 1400.     3016     24.97
  7.  -  8.      539      4.46          14.  - 16.      618      5.12         1400.  - 1600.     1855     15.36
  8.  -  9.      362      3.00          16.  - 18.      808      6.69         1600.  - 1800.      904      7.48
  9.  - 10.      382      3.16          18.  - 20.      768      6.36         1800.  - 2000.     1258     10.41
 10.  - 11.      177      1.47          20.  - 22.     1014      8.39         2000.  - 2200.      363      3.00
 11.  - 12.      219      1.81          22.  - 24.     1231     10.19         2200.  - 2400.        0       .00
 12.  - 13.      280      2.32          24.  - 26.     1145      9.48         2400.  - 2600.        0       .00
 13.  - 14.      292      2.42          26.  - 28.      618      5.12         2600.  - 2800.        0       .00
 14.  - 15.      340      2.81          28.  - 30.      180      1.49         2800.  - 3000.        0       .00
 15.  - 16.      252      2.09          30.  - 32.       64       .53         3000.  - 3200.        0       .00
 16.  - 17.      175      1.45          32.  - 34.       34       .28         3200.  - 3400.        0       .00
 17.  - 18.      310      2.57          34.  - 36.       64       .53         3400.  - 3600.        0       .00
 18.  - 19.      196      1.62          36.  - 38.      209      1.73         3600.  - 3800.        0       .00
 19.  - 20.      161      1.33          38.  - 40.      467      3.87         3800.  - 4000.        0       .00
 20.  - 21.      357      2.96          40.  - 42.      375      3.10         4000.  - 4200.        0       .00
 21.  - 22.      389      3.22          42.  - 44.      149      1.23         4200.  - 4400.        0       .00
 22.  - 23.     1731     14.33          44.  - 46.       29       .24         4400.  - 4600.        0       .00
 23.  - 24.      606      5.02          46.  - 48.        3       .02         4600.  - 4800.        0       .00
 24.  - 25.      506      4.19          48.  - 50.        0       .00         4800.  - 5000.        0       .00
 25.  - 26.      741      6.13          50.  - 52.        0       .00
 26.  - 27.      709      5.87          52.  - 54.        0       .00
 27.  - 28.      209      1.73          54.  - 56.        0       .00
 28.  - 29.       12       .10          56.  - 58.        0       .00
 29.  - 30.        0       .00          58.  - 60.        0       .00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB GVW, TEST WT. 16000 LB. TRUCK G-8
RUN DURATION 23.93 MIN. IDLE SPEED 550 RPM 10/3/74 RUN 11

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM       RANGE
RPM   1    1281.0234    443.5420       4.0831   11800      2175.0000     80.0000   2095.0000
MV    2      11.9128      8.2214        .0757   11800        25.0800       .1980     24.8820
SPD   3      18.1986     11.7002        .1077   11800        49.5222       .0000     49.5222
TP    4       1.6141      1.8756        .0173   11800         5.4000       .0000      5.4000

                                    PERCENT OF TIME                 PERCENT OF TIME
                                   THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                   LEVEL        COUNT   PERCENT    GEAR    COUNT   PERCENT


                                   CLOSED        5321    45.09       1         0       .00
                                      WOT         553     4.69       2       740     25.08
                                                                     3       630     21.36
                                                                     4      1254     42.51
                                                                     5       322     10.92
                                                                     6         0       .00
                                                                     7         4       .14

 PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT          LEVEL          COUNT   PERCENT            LEVEL           COUNT   PERCENT
       <                                       <                                          <
   . -  1.        768      6.51             . -  2.      1690     14.32                 . -  200.       9       .08
  1. -  2.       1323     11.21            2. -  4.       230      1.95             200. -  400.     248      2.10
  2. -  3.        921      7.81            4. -  6.       273      2.31             400. -  600.     774      6.56
  3. -  4.        532      4.51            6. -  8.       348      2.95             600. -  800.    1208     10.24
  4. -  5.        290      2.46            8. - 10.       497      4.21             800. - 1000.     460      3.90
  5. -  6.        259      2.19           10. - 12.       636      5.39            1000. - 1200.    1631     13.82
  6. -  7.        296      2.51           12. - 14.       580      4.92            1200. - 1400.    2932     24.85
  7. -  8.        230      1.95           14. - 16.       539      4.57            1400. - 1600.    2002     16.97
  8. -  9.        325      2.75           16. - 18.       664      5.63            1600. - 1800.     793      6.72
  9. - 10.        278      2.36           18. - 20.       736      6.24            1800. - 2000.    1027      8.70
 10. - 11.        318      2.69           20. - 22.       949      8.04            2000. - 2200.     716      6.07
 11. - 12.        301      2.55           22. - 24.       978      8.29            2200. - 2400.       0       .00
 12. - 13.        213      1.81           24. - 26.      1033      8.75            2400. - 2600.       0       .00
 13. - 14.        343      2.91           26. - 28.       887      7.52            2600. - 2800.       0       .00
 14. - 15.        145      1.23           28. - 30.       313      2.65            2800. - 3000.       0       .00
 15. - 16.        191      1.62           30. - 32.       116       .98            3000. - 3200.       0       .00
 16. - 17.        207      1.75           32. - 34.        33       .28            3200. - 3400.       0       .00
 17. - 18.        577      4.89           34. - 36.        83       .70            3400. - 3600.       0       .00
 18. - 19.        751      6.36           36. - 38.       239      2.03            3600. - 3800.       0       .00
 19. - 20.       1202     10.19           38. - 40.       371      3.14            3800. - 4000.       0       .00
 20. - 21.        347      2.94           40. - 42.       336      2.85            4000. - 4200.       0       .00
 21. - 22.        485      4.11           42. - 44.       193      1.64            4200. - 4400.       0       .00
 22. - 23.        720      6.10           44. - 46.        62       .53            4400. - 4600.       0       .00
 23. - 24.        576      4.88           46. - 48.        12       .10            4600. - 4800.       0       .00
 24. - 25.        198      1.68           48. - 50.         2       .02            4800. - 5000.       0       .00
 25. - 26.          4       .03           50. - 52.         0       .00
 26. - 27.          0       .00           52. - 54.         0       .00
 27. - 28.          0       .00           54. - 56.         0       .00
 28. - 29.          0       .00           56. - 58.         0       .00
 29. - 30.          0       .00           58. - 60.         0       .00
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1965 GMC BOX VAN WITH 351 CID V6, 19500 LB GVW, TEST WT. 16000 LB. TRUCK G-A
RUN DURATION 22.71 MIN. IDLE SPEED 550 RPM 10/3/74 RUN 12

 VAR NO       MEAN         S.D.     S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1     1411.0625    518.0961       4.8955   11200        2405.0000    205.0000    2200.0000
MV    2       12.7243      8.2605        .0781   11200          25.7070       .8250      24.8820
SPD   3       19.1682     11.9506        .1129   11200          50.3287       .0000      50.3287
TP    4        1.5961      1.7949        .0170   11200           5.5700       .0000       5.5700

                                      PERCENT OF TIME                   PERCENT OF TIME
                                     THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                     LEVEL          COUNT    PERCENT   GEAR    COUNT   PERCENT


                                     CLOSED          4741     42.32       1       65      2.32
                                        WOT           823      7.35       2      550     19.64
                                                                          3      420     15.00
                                                                          4      883     31.54
                                                                          5      878     31.36
                                                                          6        0       .00
                                                                          7        4       .14

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  WS AT                    PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT            LEVEL            COUNT   PERCENT
        <                                         <                                         <
    . -  1.      133      1.19               . -  2.     1484     13.25                 . -  200.       0       .00
   1. -  2.      850      7.59              2. -  4.      250      2.23              200. -  400.     481      4.29
   2. -  3.      587      5.24              4. -  6.      244      2.18              400. -  600.     861      7.69
   3. -  4.     1024      9.14              6. -  8.      278      2.48              600. -  800.     689      6.15
   4. -  5.      385      3.44              8. - 10.      281      2.51              800. - 1000.     453      4.04
   5. -  6.      444      3.96             10. - 12.      446      3.98             1000. - 1200.     834      7.45
   6. -  7.      456      4.07             12. - 14.      564      5.04             1200. - 1400.    1169     10.44
   7. -  8.      324      2.89             14. - 16.      646      5.77             1400. - 1600.    1888     16.86
   8. -  9.      427      3.81             16. - 18.      695      6.21             1600. - 1800.    2042     18.23
   9. - 10.      548      4.89             18. - 20.      701      6.26             1800. - 2000.    1397     12.47
  10. - 11.      350      3.12             20. - 22.      850      7.59             2000. - 2200.    1257     11.22
  11. - 12.      184      1.64             22. - 24.     1030      9.20             2200. - 2400.     127      1.13
  12. - 13.      238      2.12             24. - 26.      852      7.61             2400. - 2600.       2       .02
  13. - 14.      156      1.39             26. - 28.      845      7.54             2600. - 2800.       0       .00
  14. - 15.      216      1.93             28. - 30.      553      4.94             2800. - 3000.       0       .00
  15. - 16.      184      1.64             30. - 32.      184      1.64             3000. - 3200.       0       .00
  16. - 17.      122      1.09             32. - 34.       61       .54             3200. - 3400.       0       .00
  17. - 18.      511      4.56             34. - 36.       60       .54             3400. - 3600.       0       .00
  18. - 19.      308      2.75             36. - 38.      108       .96             3600. - 3600.       0       .00
  19. - 20.      942      8.41             38. - 40.      234      2.09             3800. - 4000.       0       .00
  20. - 21.      378      3.37             40. - 42.      286      2.55             4000. - 4200.       0       .00
  21. - 22.      245      2.19             42. - 44.      255      2.28             4200. - 4400.       0       .00
  22. - 23.      295      2.63             44. - 46.      181      1.62             4400. - 4600.       0       .00
  23. - 24.      712      6.36             46. - 48.       88       .79             4600. - 4800.       0       .00
  24. - 25.      556      4.96             48. - 50.       23       .21             4800. - 5000.       0       .00
  25. - 26.      625      5.58             50. - 52.        1       .01
  26. - 27.        0       .00             52. - 54.        0       .00
  27. - 28.        0       .00             54. - 56.        0       .00
  28. - 29.        0       .00             56. - 58.        0       .00
  29. - 30.        0       .00             58. - 60.        0       .00
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1965 GMC BOX VAN WITH 351 CID V6. 19500 LB GVW. TEST WT. 16000 LB. TRUCK G-8
RUN DURATION 22.72 MIN. IDLE SPEED 550 RPM 10/3/74 RUN 14

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM      RANGE
RPM   1    1407.0854    540.0654       5.0940  11240     2540.0000    230.0000   2310.0000
MV    2      12.5657      8.3323        .0786  11240       25.7070       .5610     25.1460
SPD   3      19.0829     12.5594        .1185  11240       53.3936       .0000     53.3936
TP    4       1.7085      1.9500        .0184  11240        5.5300       .0000      5.5300

                                   PERCENT OF TIME                  PERCENT OF TIME
                                  THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                  LEVEL         COUNT   PERCENT    GEAR    COUNT   PERCENT


                                  CLOSED         4994     44.43       1        0       .00
                                     WOT         1126     10.02       2      790     28.11
                                                                      3      474     16.87
                                                                      4      950     33.81
                                                                      5      593     21.10
                                                                      6        0       .00
                                                                      7        3       .11

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
LEVEL         COUNT   PERCENT       LEVEL         COUNT   PERCENT         LEVEL            COUNT   PERCENT
      <                                   <                                      <
   . -  1.      468      4.16          . -  2.     1592     14.16              . -  200.      0        .00
  1. -  2.      618      5.50         2. -  4.      231      2.06           200. -  400.    552       4.91
  2. -  3.      844      7.51         4. -  6.      244      2.17           400. -  600.    941       8.37
  3. -  4.      917      8.16         6. -  8.      245      2.19           600. -  800.    571       5.08
  4. -  5.      376      3.35         8. - 10.      300      2.67           800. - 1000.    393       3.50
  5. -  6.      431      3.83        10. - 12.      399      3.55          1000. - 1200.    852       7.58
  6. -  7.      544      4.84        12. - 14.      574      5.11          1200. - 1400.   1623      14.44
  7. -  8.      356      3.17        14. - 16.      697      6.20          1400. - 1600.   1706      15.18
  8. -  9.      296      2.63        16. - 18.      644      5.73          1600. - 1800.   1978      17.60
  9. - 10.      245      2.18        18. - 20.      813      7.23          1800. - 2000.    790       7.03
 10. - 11.      189      1.68        20. - 22.     1037      9.23          2000. - 2200.   1356      12.06
 11. - 12.      201      1.79        22. - 24.      939      8.35          2200. - 2400.    470       4.18
 12. - 13.      218      1.94        24. - 26.     1014      9.02          2400. - 2600.      8        .07
 13. - 14.      280      2.49        26. - 28.      813      7.23          2600. - 2800.      0        .00
 14. - 15.      145      1.29        28. - 30.      352      3.13          2800. - 3000.      0        .00
 15. - 16.      114      1.01        30. - 32.      133      1.18          3000. - 3200.      0        .00
 16. - 17.      306      2.72        32. - 34.       55       .49          3200. - 3400.      0        .00
 17. - 18.      534      4.75        34. - 36.       33       .29          3400. - 3600.      0        .00
 18. - 19.      598      5.32        36. - 38.       38       .34          3600. - 3800.      0        .00
 19. - 20.      790      7.03        38. - 40.       51       .45          3800. - 4000.      0        .00
 20. - 21.      425      3.78        40. - 42.      109       .97          4000. - 4200.      0        .00
 21. - 22.      248      2.21        42. - 44.      170      1.51          4200. - 4400.      0        .00
 22. - 23.      470      4.18        44. - 46.      23       2.06          4400. - 4600.      0        .00
 23. - 24.      731      6.50        46. - 48.      233      2.07          4600. - 4800.      0        .00
 24. - 25.      615      5.47        48. - 50.      196      1.74          4800. - 5000.      0        .00
 25. - 26.      281      2.50        50. - 52.       80       .71
 26. - 27.        0       .00        52. - 54.       16       .14
 27. - 28.        0       .00        54. - 56.        0       .00
 28. - 29.        0       .00        56. - 58.        0       .00
 29. - 30.        0       .00        58. - 60.        0       .00
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TRUCK G-9

1966 CHEVROLET 34000 LB GCW TRACTOR
WITH 366 CID V8 ENGINE

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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT. 22700 LB, TK. G-9
RUN DURATION 22.33 MIN, IDLE SPEED 600 RPM, 10/9/74 RUN 1

 VAR NO        MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM       RANGE
RPM   1   1463.0173    634.7550        6.1079  10800      3210.0000    390.0000   2820.0000
MV    2     13.0937      7.5897         .0730  10800        24.5190       .6270     23.8920
SPD   3     17.9377     11.2444         .1082  10800        53.3360       .0000     53.3360
TP    4      3.2264       .9605         .0092  10800         5.9200      2.2900      3.6300

                                   PERCENT OF TIME               PERCENT OF TIME
                                  THROTTLE POSITION AT          GEAR SHIFT POSITION AT
                                  LEVEL        COUNT   PERCENT   GEAR    COUNT   PERCENT


                                  CLOSED        5157     47.75      1      387     14.33
                                     WOT         270      2.50      2      391     14.48
                                                                    3      783     29.00
                                                                    4     1139     42.19
                                                                    5        0       .00
                                                                    6        0       .00
                                                                    7        0       .00

 PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT        LEVEL           COUNT    PERCENT
        <                                    <                                      <
   . -  1.         91       .84          . -  2.      1276     11.81              . -  200.      0        .00
  1. -  2.        907      8.40         2. -  4.       332      3.07          200. -  400.      4        .04
  2. -  3.        613      5.68         4. -  6.       336      3.13          400. -  600.   1564      14.48
  3. -  4.        465      4.31         6. -  8.       374      3.46          600. -  800.    579       5.36
  4. -  5.        436      4.04         8. - 10.       506      4.69          800. - 1000.    566       5.24
  5. -  6.        345      3.19        10. - 12.       575      5.32         1000. - 1200.    800       7.41
  6. -  7.        372      3.44        12. - 14.       559      5.18         1200. - 1400.   1632      15.11
  7. -  8.        302      2.80        14. - 16.       606      5.61         1400. - 1600.   1609      14.90
  8. -  9.        285      2.64        16. - 18.       626      5.80         1600. - 1800.    652       6.04
  9. - 10.        316      2.93        18. - 20.       665      6.16         1800. - 2000.    663       6.14
 10. - 11.        246      2.28        20. - 22.       763      7.06         2000. - 2200.   1218      11.28
 11. - 12.        197      1.82        22. - 24.       936      8.67         2200. - 2400.    837       7.75
 12. - 13.        191      1.77        24. - 26.      1117     10.34         2400. - 2600.    208       1.93
 13. - 14.        270      2.50        26. - 28.       613      5.68         2600. - 2800.    229       2.12
 14. - 15.        320      2.96        28. - 30.       205      1.90         2800. - 3000.    195       1.81
 15. - 16.        353      3.27        30. - 32.        71       .66         3000. - 3200.     42        .39
 16. - 17.       1357     12.56        32. - 34.        72       .67         3200. - 3400.      2        .02
 17. - 18.        481      4.45        34. - 36.       158      1.46         3400. - 3600.      0        .00
 18. - 19.        267      2.47        36. - 38.       315      2.92         3600. - 3800.      0        .00
 19. - 20.        332      3.07        38. - 40.       361      3.34         3800. - 4000.      0        .00
 20. - 21.        396      3.67        40. - 42.       214      1.98         4000. - 4200.      0        .00
 21. - 22.        435      4.03        42. - 44.        73       .68         4200. - 4400.      0        .00
 22. - 23.        768      7.11        44. - 46.        26       .24         4400. - 4600.      0        .00
 23. - 24.        924      8.56        46. - 48.        11       .10         4600. - 4800.      0        .00
 24. - 25.        131      1.21        48. - 50.         6       .06         4800. - 5000.      0        .00
 25. - 26.          0       .00        50. - 52.         1       .01
 26. - 27.          0       .00        52. - 54.         1       .01
 27. - 28.          0       .00        54. - 56.         0       .00
 28. - 29.          0       .00        56. - 58.         0       .00
 29. - 30.          0       .00        58. - 60.         0       .00
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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT. 22700 LB, TK. G-9
RUN DURATION 23.77 MIN. IDLE SPEED 600 RPM, 10/9/74 RUN 2

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1431.7964    652.1060       6.0547   11600       3330.0000     275.0000    3055.0000
MV    2     12.9570      7.3384        .0681   11600         24.2220        .4950      23.7270
SPD   3     16.6864     11.6438        .1081   11600         46.8023        .0000      46.8023
TP    4      3.1725       .9260        .0086   11600          5.9100       2.2900       3.6200

                                    PERCENT OF TIME                   PERCENT OF TIME
                                   THROTTLE POSITION AT               GEAR SHIFT POSITION AT
                                   LEVEL       COUNT   PERCENT        GEAR    COUNT   PERCENT

                                   CLOSED       5638     48.60           1      754     26.00
                                      WOT        268      2.31           2      413     14.24
                                                                         3      755     26.03
                                                                         4      978     33.72
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        0       .00

PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                   PERCENT OF TIME RPM AT
LEVEL           COUNT   PERCENT         LEVEL            COUNT   PERCENT         LEVEL              COUNT   PERCENT
         <                                       <                                         <
   . -  1.        177      1.53             . -  2.       2005     17.28              . -  200.        0        .00
  1. -  2.        808      6.97            2. -  4.        313      2.70           200. -  400.       24        .21
  2. -  3.        702      6.05            4. -  6.        352      3.03           400. -  600.     2036      17.55
  3. -  4.        452      3.90            6. -  8.        377      3.25           600. -  800.      584       5.03
  4. -  5.        482      4.15            8. - 10.        466      4.02           800. - 1000.      481       4.15
  5. -  6.        395      3.41           10. - 12.        483      4.16          1000. - 1200.      974       8.40
  6. -  7.        360      3.10           12. - 14.        723      6.23          1200. - 1400.     1646      14.19
  7. -  8.        299      2.58           14. - 16.        825      7.11          1400. - 1600.     1675      14.44
  8. -  9.        267      2.30           16. - 18.        668      5.76          1600. - 1800.      694       5.98
  9. - 10.        322      2.78           18. - 20.        694      5.98          1800. - 2000.      619       5.34
 10. - 11.        280      2.41           20. - 22.        706      6.09          2000. - 2200.     1430      12.33
 11. - 12.        230      1.98           22. - 24.        864      7.45          2200. - 2400.      638       5.50
 12. - 13.        235      2.03           24. - 26.        923      7.96          2400. - 2600.      256       2.21
 13. - 14.        272      2.34           26. - 28.        657      5.66          2600. - 2800.      306       2.64
 14. - 15.        380      3.28           28. - 30.        223      1.92          2800. - 3000.      176       1.52
 15. - 16.        788      6.79           30. - 32.         82       .71          3000. - 3200.       42        .36
 16. - 17.       1541     13.28           32. - 34.         77       .66          3200. - 3400.       19        .16
 17. - 18.        612      5.28           34. - 36.        167      1.44          3400. - 3600.        0        .00
 18. - 19.        221      1.91           36. - 38.        266      2.29          3600. - 3800.        0        .00
 19. - 20.        304      2.62           38. - 40.        346      2.98          3800. - 4000.        0        .00
 20. - 21.        344      2.97           40. - 42.        235      2.03          4000. - 4200.        0        .00
 21. - 22.        431      3.72           42. - 44.        124      1.07          4200. - 4400.        0        .00
 22. - 23.        833      7.18           44. - 46.         22       .19          4400. - 4600.        0        .00
 23. - 24.        842      7.26           46. - 48.          2       .02          4600. - 4800.        0        .00
 24. - 25.         23       .20           48. - 50.          0       .00          4800. - 5000.        0        .00
 25. - 26.          0       .00           50. - 52.          0       .00
 26. - 27.          0       .00           52. - 54.          0       .00
 27. - 28.          0       .00           54. - 56.          0       .00
 28. - 29.          0       .00           56. - 58.          0       .00
 29. - 30.          0       .00           58. - 60.          0       .00
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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT. 22760 LB, TK. G-9
RUN DURATION 24.47 MIN, IDLE SPEED 600 RPM, 10/9/74 RUN 3

 VAR NO      MEAN        S.D.    S.E. OF MEAN  SAMPLE
RPM   1   1347.5554    767.0297       6.7067  13080      MAXIMUM      MINIMUM       RANGE
MV    2     11.7288      8.0778        .0706  13080    3445.0000        .0000   3445.0000
SPD   3     14.9540     11.9850        .1048  13080      24.7170      -.2970     25.0140
TP    4      3.1197       .9496        .0083  13080      63.5365        .0000     63.5365
                                                          5.8000       2.2900      3.5100

                               PERCENT OF TIME
                              THROTTLE POSITION AT              PERCENT OF TIME
                              LEVEL          COUNT   PERCENT    GEAR SHIFT POSITION AT
                                                                GEAR     COUNT   PERCENT

                              CLOSED          7039     53.81
                                 WOT           115       .88       1       577     17.65
                                                                   2       346     10.58
                                                                   3      1275     38.99
                                                                   4      1071     32.75
                                                                   5         0       .00
                                                                   6         0       .00
                                                                   7         1       .03

PERCENT OF TIME  MV AT            PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT    LEVEL          COUNT   PERCENT     LEVEL              COUNT   PERCENT
      <                                 <                                    <
  . -  1.        562      4.30      . -  2.       2922     22.34         . -  200.       1194      9.13
 1. -  2.        820      6.27     2. -  4.        469      3.59      200. -  400.         13       .10
 2. -  3.        435      3.33     4. -  6.        417      3.19      400. -  600.       2139     16.35
 3. -  4.        477      3.65     6. -  8.        511      3.91      600. -  800.        509      3.89
 4. -  5.        396      3.03     8. - 10.        678      5.18      800. - 1000.        516      3.94
 5. -  6.        405      3.10    10. - 12.        672      5.14     1000. - 1200.        592      4.53
 6. -  7.        261      2.00    12. - 14.        759      5.80     1200. - 1400.       1455     11.12
 7. -  8.        340      2.60    14. - 16.        729      5.57     1400. - 1600.       2129     16.28
 8. -  9.        290      2.22    16. - 18.        680      5.20     1600. - 1800.        806      6.16
 9. - 10.        337      2.58    18. - 20.        629      4.81     1800. - 2000.        665      5.08
10. - 11.        366      2.80    20. - 22.        698      5.34     2000. - 2200.        883      6.75
11. - 12.        388      2.97    22. - 24.        799      6.11     2200. - 2400.       1261      9.64
12. - 13.        414      3.17    24. - 26.        957      7.32     2400. - 2600.        291      2.22
13. - 14.        326      2.49    26. - 28.        593      4.53     2600. - 2800.        250      1.91
14. - 15.        245      1.87    28. - 30.        284      2.17     2800. - 3000.        266      2.03
15. - 16.        361      2.76    30. - 32.        110       .84     3000. - 3200.         86       .66
16. - 17.       1760     13.46    32. - 34.         91       .70     3200. - 3400.         21       .16
17. - 18.        634      4.85    34. - 36.         95       .73     3400. - 3600.          4       .03
18. - 19.        210      1.61    36. - 38.        208      1.59     3600. - 3800.          0       .00
19. - 20.        219      1.67    38. - 40.        269      2.06     3800. - 4000.          0       .00
20. - 21.        303      2.32    40. - 42.        278      2.13     4000. - 4200.          0       .00
21. - 22.        419      3.20    42. - 44.        161      1.23     4200. - 4400.          0       .00
22. - 23.        833      6.37    44. - 46.         57       .44     4400. - 4600.          0       .00
23. - 24.       1060      8.10    46. - 48.          8       .06     4600. - 4800.          0       .00
24. - 25.         46       .35    48. - 50.          4       .03     4800. - 5000.          0       .00
25. - 26.          0       .00    50. - 52.          1       .01
26. - 27.          0       .00    52. - 54.          0       .00
27. - 28.          0       .00    54. - 56.          0       .00
28. - 29.          0       .00    56. -    .          0       .00
29. - 30.          0       .00    58. - 60.          0       .00
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1966 CHEVROLET TRACTOR WITH 366 CID V8. 34000 LB GCW. TEST WT. 22700 LP. TK. G-9
RUN DURATION 20.31 MIN. IDLE SPEED 600 RPM. 10/9/74 RUN 4

 VAR NO      MEAN        S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM       RANGE
RPM   1   1441.9058    504.6649      5.0670    9920      2920.0000    400.0000   2520.0000
MV    2     10.9601      8.2019       .0823    9920        24.0900       .0000     24.0900
SPD   3     19.5150     10.6184       .1066    9920        47.0023       .0000     47.0023
TP    4      3.4451      1.0569       .0106    9920         5.7400      2.2400      3.5000

                                PERCENT OF TIME                 PERCENT OF TIME
                               THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                               LEVEL         COUNT   PERCENT   GEAR     COUNT   PERCENT


                               CLOSED         3844     38.75      1       278     11.21
                                  WOT           13       .13      2       386     15.56
                                                                  3       864     34.84
                                                                  4       952     38.39
                                                                  5         0       .00
                                                                  6         0       .00
                                                                  7         0       .00

 PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
 LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT     LEVEL              COUNT   PERCENT
         <                                   <                                  <
      . -  1.     1517     15.29          . -  2.     822      8.29           . -  200.       0        .00
     1. -  2.      651      6.56         2. -  4.     155      1.56        200. -  400.       0        .00
     2. -  3.      518      5.22         4. -  6.     338      3.41        400. -  600.     711       7.17
     3. -  4.      369      3.72         6. -  8.     216      2.18        600. -  800.     511       5.15
     4. -  5.      415      4.18         8. - 10.     269      2.71        800. - 1000.     480       4.84
     5. -  6.      399      4.02        10. - 12.     429      4.32       1000. - 1200.    1309      13.20
     6. -  7.      344      3.47        12. - 14.     512      5.16       1200. - 1400.    1689      17.03
     7. -  8.      222      2.24        14. - 16.     561      5.66       1400. - 1600.    2249      22.67
     8. -  9.      177      1.78        16. - 18.     714      7.20       1600. - 1800.     733       7.39
     9. - 10.      211      2.13        18. - 20.     862      8.69       1800. - 2000.     348       3.51
    10. - 11.      191      1.93        20. - 22.     942      9.50       2000. - 2200.     705       7.11
    11. - 12.      172      1.73        22. - 24.     936      9.44       2200. - 2400.    1077      10.86
    12. - 13.      212      2.14        24. - 26.    1139     11.48       2400. - 2600.      75        .76
    13. - 14.      203      2.05        26. - 28.     646      6.51       2600. - 2800.      30        .30
    14. - 15.      270      2.72        28. - 30.     162      1.63       2800. - 3000.       3        .03
    15. - 16.      251      2.53        30. - 32.      47       .47       3000. - 3200.       0        .00
    16. - 17.      784      7.90        32. - 34.      53       .53       3200. - 3400.       0        .00
    17. - 18.      570      5.75        34. - 36.      94       .95       3400. - 3600.       0        .00
    18. - 19.      193      1.95        36. - 38.     217      2.19       3600. - 3800.       0        .00
    19. - 20.      223      2.25        38. - 40.     343      3.46       3800. - 4000.       0        .00
    20. - 21.      264      2.66        40. - 42.     271      2.73       4000. - 4200.       0        .00
    21. - 22.      554      5.58        42. - 44.     153      1.54       4200. - 4400.       0        .00
    22. - 23.      832      8.39        44. - 46.      37       .37       4400. - 4600.       0        .00
    23. - 24.      375      3.78        46. - 48.       2       .02       4600. - 4800.       0        .00
    24. - 25.        3       .03        48. - 50.       0       .00       4800. - 5000.       0        .00
    25. - 26.        0       .00        50. - 52.       0       .00
    26. - 27.        0       .00        52. - 54.       0       .00
    27. - 28.        0       .00        54. - 56.       0       .00
    28. - 29.        0       .00        56. - 58.       0       .00
    29. - 30.        0       .00        58. - 60.       0       .00
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1966 CHEVROLET TRACTOR WITH 366 CID V6, 34000 LB GCW, TEST WT. 22700 LB, TK. G-9
RUN DURATION 24.69 MIN. IDLE SPEED 600 RPM, 10/9/74 RUN 5

 VAR NO       MEAN        S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM      MINIMUM       RANGE
RPM   1    1282.5083   523.3967        4.7621   12080     2905.0000     445.0000   2460.0000
MV    2      12.0218     7.7364         .0704   12080       23.7930        .0990     23.6940
SPD   3      16.1143    11.0359         .1004   12080       45.2689        .0000     45.2689
TP    4       3.2538     1.0340         .0094   12080        5.7300       2.1900      3.5400

                                 PERCENT OF TIME                      PERCENT OF TIME
                                 THROTTLE POSITION AT                 GEAR SHIFT POSITION AT
                                 LEVEL          COUNT   PERCENT       GEAR    COUNT   PERCENT

                                 CLOSED          5872     48.61          1      673     22.28
                                   WOT              2       .02          2      383     12.68
                                                                         3      860     28.48
                                                                         4     1103     36.52
                                                                         5        0       .00
                                                                         6        0       .00
                                                                         7        1       .03

PERCENT OF TIME  MV AT            PERCENT OF TIME  WS AT            PERCENT OF TIME RPM AT
LEVEL          COUNT  PERCENT     LEVEL          COUNT  PERCENT     LEVEL              COUNT  PERCENT
       <                                 <                                  <
   . -  1.      1541    12.76        . -  2.      2149    17.79          . -  200.       0       .00
  1. -  2.       869     7.19       2. -  4.       278     2.30      200. -  400.       0       .00
  2. -  3.       281     2.33       4. -  6.       381     3.15      400. -  600.    2458     20.35
  3. -  4.       235     1.95       6. -  8.       390     3.23      600. -  800.     404      3.34
  4. -  5.       303     2.51       8. - 10.       454     3.76      800. - 1000.     563      4.66
  5. -  6.       373     3.09      10. - 12.       551     4.56     1000. - 1200.    1149      9.51
  6. -  7.       286     2.37      12. - 14.       797     6.60     1200. - 1400.    2922     24.19
  7. -  8.       320     2.65      14. - 16.       799     6.61     1400. - 1600.    1605     13.29
  8. -  9.       318     2.63      16. - 18.       628     5.20     1600. - 1800.     672      5.56
  9. - 10.       278     2.30      18. - 20.       765     6.33     1800. - 2000.     920      7.62
 10. - 11.       251     2.08      20. - 22.      1003     8.30     2000. - 2200.     861      7.13
 11. - 12.       295     2.44      22. - 24.      1159     9.59     2200. - 2400.     411      3.40
 12. - 13.       289     2.39      24. - 26.       961     7.96     2400. - 2600.      97       .80
 13. - 14.       231     1.91      26. - 28.       345     2.86     2600. - 2800.      14       .12
 14. - 15.       252     2.09      28. - 30.       128     1.06     2800. - 3000.       4       .03
 15. - 16.       593     4.91      30. - 32.       186     1.54     3000. - 3200.       0       .00
 16. - 17.      2018    16.71      32. - 34.       212     1.75     3200. - 3400.       0       .00
 17. - 18.       527     4.36      34. - 36.       224     1.85     3400. - 3600.       0       .00
 18. - 19.       257     2.13      36. - 38.       261     2.16     3600. - 3800.       0       .00
 19. - 20.       286     2.37      38. - 40.       250     2.07     3800. - 4000.       0       .00
 20. - 21.       388     3.21      40. - 42.       126     1.04     4000. - 4200.       0       .00
 21. - 22.       603     4.99      42. - 44.        28      .23     4200. - 4400.       0       .00
 22. - 23.       908     7.52      44. - 46.         5      .04     4400. - 4600.       0       .00
 23. - 24.       378     3.13      46. - 48.         0      .00     4600. - 4800.       0       .00
 24. - 25.         0      .00      48. - 50.         0      .00     4800. - 5000.       0       .00
 25. - 26.         0      .00      50. - 52.         0      .00
 26. - 27.         0      .00      52. - 54.         0      .00
 27. - 28.         0      .00      54. - 56.         0      .00
 28. - 29.         0      .00      56. - 58.         0      .00
 29. - 30.         0      .00      58. - 60.         0      .00
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1966 CHEVROLET TRACTOR WITH 366 CID V8. 34000 LB GCW. TEST WT. 22700 LB. TK. G-9
RUN DURATION 22.92 MIN. IDLE SPEED 600 RPM. 10/9/74 RUN 6

 VAR NO       MEAN        S.D.   S.E. OF MEAN  SAMPLE      MAXIMUM     MINIMUM      RANGE
RPM   1   1389.8447    548.3185       5.1719   11240    3275.0000    315.0000   2960.0000
MV    2     11.8422      7.9404        .0749   11240      24.2880       .1320     24.1560
SPD   3     17.1789     10.9233        .1030   11240      63.6032       .0000     63.6032
TP    4      3.3412      1.0406        .0098   11240       5.8000      2.1900      3.6100

                                  PERCENT OF TIME                 PERCENT OF TIME
                                 THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT     GEAR    COUNT   PERCENT


                                 CLOSED        4909     43.67       1       525     18.68
                                    WOT          24       .21       2       339     12.06
                                                                    3       762     27.12
                                                                    4      1184     42.14
                                                                    5         0       .00
                                                                    6         0       .00
                                                                    7         0       .00
PERCENT OF TIME  MV AT
LEVEL          COUNT   PERCENT       PERCENT OF TIME  WS AT
       <                             LEVEL          COUNT   PERCENT      PERCENT OF TIME RPM AT
   . -  1.      1447     12.87              <                            LEVEL          COUNT   PERCENT
  1. -  2.       786      6.99          . -  2.      1272     11.32                <
  2. -  3.       351      3.12         2. -  4.       281      2.50          . -  200.       0       .00
  3. -  4.       350      3.11         4. -  6.       393      3.50       200. -  400.      12       .11
  4. -  5.       326      2.90         6. -  8.       483      4.30       400. -  600.    1532     13.63
  5. -  6.       269      2.39         8. - 10.       560      4.98       600. -  800.     416      3.70
  6. -  7.       268      2.38        10. - 12.       654      5.82       800. - 1000.     524      4.66
  7. -  8.       246      2.19        12. - 14.       625      5.56      1000. - 1200.    1243     11.06
  8. -  9.       378      3.36        14. - 16.       720      6.41      1200. - 1400.    2611     23.23
  9. - 10.       332      2.95        16. - 18.       728      6.48      1400. - 1600.    1326     11.80
 10. - 11.       302      2.69        18. - 20.       984      8.75      1600. - 1600.    1021      9.08
 11. - 12.       288      2.56        20. - 22.      1114      9.91      1800. - 2000.     617      5.49
 12. - 13.       267      2.38        22. - 24.      1130     10.05      2000. - 2200.     772      6.87
 13. - 14.       325      2.89        24. - 26.       620      5.52      2200. - 2400.     799      7.11
 14. - 15.       281      2.50        26. - 28.       280      2.49      2400. - 2600.     299      2.66
 15. - 16.       348      3.10        28. - 30.       131      1.17      2600. - 2800.      61       .54
 16. - 17.      1462     13.01        30. - 32.        79       .70      2800. - 3000.       4       .04
 17. - 18.       353      3.14        32. - 34.        97       .86      3000. - 3200.       1       .01
 18. - 19.       261      2.32        34. - 36.       169      1.50      3200. - 3400.       2       .02
 19. - 20.       320      2.85        36. - 38.       200      1.78      3400. - 3600.       0       .00
 20. - 21.       311      2.77        38. - 40.       253      2.25      3600. - 3800.       0       .00
 21. - 22.       407      3.62        40. - 42.       254      2.26      3800. - 4000.       0       .00
 22. - 23.       907      8.07        42. - 44.       142      1.26      4000. - 4200.       0       .00
 23. - 24.       621      5.52        44. - 46.        47       .42      4200. - 4400.       0       .00
 24. - 25.        34       .30        46. - 48.        17       .15      4400. - 4600.       0       .00
 25. - 26.         0       .00        48. - 50.         5       .04      4600. - 4800.       0       .00
 26. - 27.         0       .00        50. - 52.         0       .00      4800. - 5000.       0       .00
 27. - 26.         0       .00        52. - 54.         1       .01
 28. - 29.         0       .00        54. - 56.         0       .00
 29. - 30.         0       .00        56. - 58.         0       .00
                                      58. - 60.         0       .00
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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT. 22700 LB, TK G-4
RUN DURATION 25.40 MIN., IDLE SPEED      RPM, 10/09/74 RUN 7

 VAR NO        MEAN        S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM      RANGE
RPM  1     1612.2178    705.1978      25.6988      753       3500.0000    525.0000   2975.0000
MV   2       13.8558      6.9133        .2519      753         24.0900       .4950     23.5950
SPD  3       15.6807     10.1665        .3705      753         37.3352      0.0000     37.3352

   PERCENT OF TIME  MV AT               PERCENT OF TIME  MB AT               PERCENT OF TIME RPM AT
   LEVEL          COUNT  PERCENT         LEVEL          COUNT   PERCENT         LEVEL          COUNT   PERCENT
       <                                     <                                      <
   0 -  1            7      .93         0 -  2          124     16.47          0 -  200          0      0.00
   1 -  2           51     6.77         2 -  4           26      3.45        200 -  400          0      0.00
   2 -  3           25     3.32         4 -  6           18      2.39        400 -  600         32      4.25
   3 -  4           20     2.66         6 -  8           31      4.12        600 -  800        114     15.14
   4 -  5           18     2.39         8 - 10           37      4.91        800 - 1000         18      2.39
   5 -  6           19     2.52        10 - 12           22      2.92       1000 - 1200         35      4.65
   6 -  7           20     2.66        12 - 14           43      5.71       1200 - 1400         62      8.23
   7 -  8           22     2.92        14 - 16           57      7.57       1400 - 1600        144     19.12
   8 -  9           24     3.19        16 - 18           46      6.11       1600 - 1800         58      7.70
   9 - 10           26     3.45        18 - 20           48      6.37       1800 - 2000         62      8.23
  10 - 11           19     2.52        20 - 22           43      5.71       2000 - 2200         58      7.70
  11 - 12           27     3.59        22 - 24           41      5.44       2200 - 2400         38      5.05
  12 - 13           18     2.39        24 - 26           76     10.09       2400 - 2600         46      6.11
  13 - 14           30     3.98        26 - 28           75      9.96       2600 - 2800         40      5.31
  14 - 15           19     2.52        28 - 30           20      2.66       2800 - 3000         27      3.59
  15 - 16           25     3.32        30 - 32           16      2.12       3000 - 3200         15      1.99
  16 - 17          128    17.00        32 - 34           12      1.59       3200 - 3400          3       .40
  17 - 18           50     6.64        34 - 36            8      1.06       3400 - 3600          1       .13
  18 - 19           17     2.26        36 - 38           10      1.33       3600 - 3800          0      0.00
  19 - 20           16     2.12        38 - 40            0      0.00       3800 - 4000          0      0.00
  20 - 21           22     2.92        40 - 42            0      0.00       4000 - 4200          0      0.00
  21 - 22           30     3.98        42 - 44            0      0.00       4200 - 4400          0      0.00
  22 - 23           63     8.37        44 - 46            0      0.00       4400 - 4600          0      0.00
  23 - 24           56     7.44        46 - 48            0      0.00       4600 - 4800          0      0.00
  24 - 25            1      .13        48 - 50            0      0.00       4800 - 5000          0      0.00
  25 - 26            0     0.00        50 - 52            0      0.00
  26 - 27            0     0.00        52 - 54            0      0.00
  27 - 28            0     0.00        54 - 56            0      0.00
  28 - 29            0     0.00        56 - 58            0      0.00
  29 - 30            0     0.00        58 - 60            0      0.00
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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT, 22700 LB, TK G-9
RUN DURATION 21,63 MIN., IDLE SPEED       RPM, 10/09/74 RUN 8

 VAR NO      MEAN         S.D.     S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM        RANGE
RPM  1    1605,4147    628,4401       24,6305     651      3150,0000       0.0000    3150,0000
MV   2      12,9898      7,7807        ,3049      651        24,0900      -3,3000      27,3900
SPD  3      18,3517     10,5759        ,4145      651        43,3355       0.0000      43,3355

   PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
   LEVEL         COUNT   PERCENT         LEVEL         COUNT   PERCENT          LEVEL          COUNT   PERCENT
       <                                     <                                       <
   0 -   1         23      3,53          0 -   2         66     10.19           0 -   200         2       ,31
   1 -   2         82     12,60          2 -   4         22      3.38         200 -   400         0      0,00
   2 -   3         30      4,61          4 -   6         13      2.00         400 -   600        19      2,92
   3 -   4         18      2,76          6 -   8         17      2,61         600 -   800        78     11,98
   4 -   5          8      1,23          8 -  10         35      5,38         800 -  1000        18      2,76
   5 -   6         13      2,00         10 -  12         20      3,07        1000 -  1200        33      5,07
   6 -   7         13      2,00         12 -  14         49      7,53        1200 -  1400        78     11,98
   7 -   8         10      1,54         14 -  16         39      5,99        1400 -  1600       123     18,89
   8 -   9         12      1,84         16 -  18         36      5,53        1600 -  1800        34      5,22
   9 -  10         16      2,46         18 -  20         26      3,99        1800 -  2000        60      9,22
  10 -  11         17      2,61         20 -  22         40      6,14        2000 -  2200        73     11,21
  11 -  12         14      2,15         22 -  24         69     10,60        2200 -  2400        69     10,60
  12 -  13         22      3,38         24 -  26         75     11,52        2400 -  2600        24      3,69
  13 -  14         23      3,53         26 -  28         45      6,91        2600 -  2800        18      2,76
  14 -  15         19      2,92         28 -  30         10      1.54        2800 -  3000        15      2,30
  15 -  16         20      3,07         30 -  32         17      2,61        3000 -  3200         7      1,08
  16 -  17         73     11,21         32 -  34         21      3,23        3200 -  3400         0      0,00
  17 -  18         37      5,68         34 -  36         13      2,00        3400 -  3600         0      0,00
  18 -  19         27      4,15         36 -  38         17      2,61        3600 -  3800         0      0,00
  19 -  20         22      3,38         38 -  40         12      1,84        3800 -  4000         0      0,00
  20 -  21         15      2,30         40 -  42          4       .61        4000 -  4200         0      0,00
  21 -  22         33      5,07         42 -  44          5       ,77        4200 -  4400         0      0,00
  22 -  23         58      8,91         44 -  46          0      0,00        4400 -  4600         0      0,00
  23 -  24         42      6,45         46 -  48          0      0,00        4600 -  4800         0      0,00
  24 -  25          2       ,31         48 -  50          0      0,00        4800 -  5000         0      0,00
  25 -  26          0      0,00         50 -  52          0      0,00
  26 -  27          0      0,00         52 -  54          0      0,00
  27 -  28          0      0,00         54 -  56          0      0,00
  28 -  29          0      0,00         56 -  58          0      0.00
  29 -  30          0      0,00         58 -  60          0      0,00
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1966 CHEVROLET TRACTOR WITH 366 CID V8, 34000 LB GCW, TEST WT, 22700 LB, TK G-9
RUN DURATION 26,61 MIN,, IDLE SPEED      RPM, 10/09/74 RUN 9

 VAR NO      MEAN        S.D.     S.E. OF MEAN  SAMPLE      MAXIMUM    MINIMUM       RANGE
RPM  1    1985,6355    699,1626     25,1797      771      3300,0000   500,0000   2800,0000
MV   2      13,9307      7,0776       ,2549      771        24,0900    -3,1350     27,2250
SPD  3      15,1988     11,7269       ,4223      771        50,6692      ,3333     50,3358
                                                                                PERCENT OF TIME RPM AT
  PERCENT OF TIME  MV AT                  PERCENT OF TIME  MS AT                  LEVEL          COUNT   PERCENT
  LEVEL          COUNT   PERCENT           LEVEL          COUNT   PERCENT                <
        <                                        <                                  0 -   200        0      0,00
  0 -   1          23      2,98            0 -   2         184     23.87           200 -   400        0      0,00
  1 -   2          58      7,52            2 -   4          21      2.72           400 -   600      105     13,62
  2 -   3          18      2,33            4 -   6          18      2.33           600 -   800      106     13,75
  3 -   4          20      2,59            6 -   8          28      3.63           800 -  1000       22      2,85
  4 -   5          19      2,46            8 -  10          26      3.37          1000 -  1200       44      5,71
  5 -   6          21      2,72           10 -  12          34      4.41          1200 -  1400       51      6,61
  6 -   7          20      2,59           12 -  14          51      6.61          1400 -  1600       98     12,71
  7 -   8          17      2,20           14 -  16          33      4.28          1600 -  1800       51      6,61
  8 -   9          20      2,59           16 -  18          34      4.41          1800 -  2000       61      7,91
  9 -  10          15      1,95           18 -  20          41      5.32          2000 -  2200       98     12,71
 10 -  11          16      2,08           20 -  22          58      7.52          2200 -  2400       66      8,56
 11 -  12          36      4,67           22 -  24          42      5.45          2400 -  2600       32      4,15
 12 -  13          19      2,46           24 -  26          53      6.87          2600 -  2800       15      1,95
 13 -  14          18      2,33           26 -  28          50      6.49          2800 -  3000       13      1,69
 14 -  15          23      2,98           28 -  30          14      1.82          3000 -  3200        6       ,78
 15 -  16          27      3,50           30 -  32          14      1.82          3200 -  3400        3       ,39
 16 -  17         181     23,48           32 -  34           9      1.17          3400 -  3600        0      0,00
 17 -  18          29      3,76           34 -  36          19      2.46          3600 -  3800        0      0,00
 18 -  19          18      2,33           36 -  38           8      1.04          3800 -  4000        0      0,00
 19 -  20          19      2,46           38 -  40          19      2.46          4000 -  4200        0      0,00
 20 -  21          16      2,08           40 -  42          13      1.69          4200 -  4400        0      0,00
 21 -  22          22      2,85           42 -  44           1       .13          4400 -  4600        0      0,00
 22 -  23          48      6,23           44 -  46           0      0.00          4600 -  4800        0      0,00
 23 -  24          60      7,78           46 -  48           0      0.00          4800 -  5000        0      0,00
 24 -  25           3       ,39           48 -  50           0      0.00
 25 -  26           0      0,00           50 -  52           1       .13
 26 -  27           0      0,00           52 -  54           0      0.00
 27 -  28           0      0,00           54 -  56           0      0.00
 28 -  29           0      0,00           56 -  58           0      0.00
 29 -  30           0      0,00           58 -  60           0      0.00
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TRUCK G-10

1969 FORD 43500 LB GCW TRACTOR
WITH 391 CID V8 ENGINE

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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 22.25 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 2

  VAR NO       MEAN          S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM    1    1224.5225     424.3135       4.0310   11080       2475.0000    225.0000    2250.0000
MV     2      12.4659       7.1320        .0678   11080         23.1990       .4290      22.7700
SPD    3      19.4854      12.3445        .1173   11080         50.1396       .0000      50.1396
TP     4       1.3095        .7455        .0071   11080          3.2300       .4200       2.8100

                                       PERCENT OF TIME                  PERCENT OF TIME
                                      THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                      LEVEL        COUNT    PERCENT    GEAR     COUNT    PERCENT

                                      CLOSED        4516      40.76       1       541      19.53
                                         WOT         159       1.44       2       322      11.62
                                                                          3       508      18.34
                                                                          4       947      34.19
                                                                          5       450      16.25
                                                                          6         0        .00
                                                                          7         2        .07

PERCENT OF TIME  MV AT                  PERCENT OF TIME  WS AT                  PERCENT OF TIME RPM AT
LEVEL          COUNT    PERCENT         LEVEL          COUNT    PERCENT         LEVEL            COUNT    PERCENT
        <                                       <                                         <
  . -  1.       1117      10.08           . -  2.       1307      11.80             . -  200.       0         .00
 1. -  2.        334       3.01          2. -  4.        463       4.18          200. -  400.      35         .32
 2. -  3.        223       2.01          4. -  6.        425       3.84          400. -  600.    1166       10.52
 3. -  4.        343       3.10          6. -  8.        375       3.38          600. -  800.     663        5.98
 4. -  5.        361       3.26          8. - 10.        272       2.45          800. - 1000.    1116       10.07
 5. -  6.        422       3.81         10. - 12.        409       3.69         1000. - 1200.    2710       24.46
 6. -  7.        239       2.16         12. - 14.        523       4.72         1200. - 1400.    1671       15.08
 7. -  8.        340       3.07         14. - 16.        426       3.84         1400. - 1600.    1124       10.14
 8. -  9.        410       3.70         16. - 18.        441       3.98         1600. - 1800.    1648       14.87
 9. - 10.        395       3.56         18. - 20.        558       5.04         1800. - 2000.     646        5.83
10. - 11.        283       2.55         20. - 22.        634       5.72         2000. - 2200.     249        2.25
11. - 12.        392       3.54         22. - 24.        868       7.83         2200. - 2400.      50         .45
12. - 13.        356       3.21         24. - 26.        865       7.81         2400. - 2600.       2         .02
13. - 14.        378       3.41         26. - 28.       1055       9.52         2600. - 2800.       0         .00
14. - 15.        362       3.27         28. - 30.        783       7.07         2800. - 3000.       0         .00
15. - 16.        475       4.29         30. - 32.        271       2.45         3000. - 3200.       0         .00
16. - 17.        448       4.04         32. - 34.        114       1.03         3200. - 3400.       0         .00
17. - 18.       1203      10.86         34. - 36.         76        .69         3400. - 3600.       0         .00
18. - 19.        480       4.33         36. - 38.        114       1.03         3600. - 3800.       0         .00
19. - 20.        684       6.17         38. - 40.        256       2.31         3800. - 4000.       0         .00
20. - 21.        463       4.18         40. - 42.        329       2.97         4000. - 4200.       0         .00
21. - 22.        723       6.53         42. - 44.        296       2.67         4200. - 4400.       0         .00
22. - 23.        626       5.65         44. - 46.        159       1.44         4400. - 4600.       0         .00
23. - 24.         23        .21         46. - 48.         49        .44         4600. - 4800.       0         .00
24. - 25.          0        .00         48. - 50.         10        .09         4800. - 5000.       0         .00
25. - 26.          0        .00         50. - 52.          2        .02
26. - 27.          0        .00         52. - 54.          0        .00
27. - 28.          0        .00         54. - 56.          0        .00
28. - 29.          0        .00         56. - 58.          0        .00
29. - 30.          0        .00         58. - 60.          0        .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 22.33 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 3

 VAR NO       MEAN        S.D.    S.E. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1301.0659   418.0630        4.0080  10880      2685.0000    330.0000   2355.0000
MV    2     12.4480     7.2547         .0696  10880        22.9350       .4290     22.5060
SPD   3     19.8003    12.0545         .1156  10880        52.0065       .0000     52.0065
TP    4      1.3282      .7577         .0073  10880         3.3200       .3800      2.9400

                                   PERCENT OF TIME                PERCENT OF TIME
                                  THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                  LEVEL         COUNT   PERCENT   GEAR    COUNT   PERCENT


                                  CLOSED         4478     41.16      1      446     10.40
                                     WOT          324      2.98      2      235      8.64
                                                                     3      526     19.34
                                                                     4     1197     44.01
                                                                     5      315     11.58
                                                                     6        0       .00
                                                                     7        1       .04

 PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
 LEVEL        COUNT   PERCENT         LEVEL         COUNT   PERCENT         LEVEL         COUNT   PERCENT
        <                                   <                                      <
   . -  1.     1030      9.47            . -  2.     1022      9.39            . -  200.       0       .00
  1. -  2.      508      4.67           2. -  4.      366      3.36         200. -  400.      25       .23
  2. -  3.      335      3.08           4. -  6.      493      4.53         400. -  600.     842      7.74
  3. -  4.      242      2.22           6. -  8.      387      3.56         600. -  800.     559      5.14
  4. -  5.      330      3.03           8. - 10.      340      3.12         800. - 1000.     727      6.68
  5. -  6.      295      2.71          10. - 12.      404      3.71        1000. - 1200.    2154     19.80
  6. -  7.      315      2.90          12. - 14.      461      4.24        1200. - 1400.    2337     21.48
  7. -  8.      300      2.76          14. - 16.      537      4.94        1400. - 1600.    1320     12.13
  8. -  9.      417      3.83          16. - 18.      597      5.49        1600. - 1800.    1685     15.49
  9. - 10.      310      2.85          18. - 20.      607      5.58        1800. - 2000.     830      7.63
 10. - 11.      355      3.26          20. - 22.      653      6.00        2000. - 2200.     244      2.24
 11. - 12.      297      2.73          22. - 24.      878      8.07        2200. - 2400.      80       .74
 12. - 13.      286      2.63          24. - 26.      788      7.24        2400. - 2600.      65       .60
 13. - 14.      522      4.80          26. - 28.      843      7.75        2600. - 2800.      12       .11
 14. - 15.      317      2.91          28. - 30.      816      7.50        2800. - 3000.       0       .00
 15. - 16.      409      3.76          30. - 32.      318      2.92        3000. - 3200.       0       .00
 16. - 17.      505      4.64          32. - 34.      139      1.28        3200. - 3400.       0       .00
 17. - 18.     1023      9.40          34. - 36.       86       .79        3400. - 3600.       0       .00
 18. - 19.      468      4.30          36. - 38.      124      1.14        3600. - 3800.       0       .00
 19. - 20.      719      6.61          38. - 40.      169      1.55        3800. - 4000.       0       .00
 20. - 21.      530      4.87          40. - 42.      252      2.32        4000. - 4200.       0       .00
 21. - 22.      686      6.31          42. - 44.      282      2.59        4200. - 4400.       0       .00
 22. - 23.      681      6.26          44. - 46.      196      1.80        4400. - 4600.       0       .00
 23. - 24.        0       .00          46. - 48.       86       .79        4600. - 4800.       0       .00
 24. - 25.        0       .00          48. - 50.       28       .26        4800. - 5000.       0       .00
 25. - 26.        0       .00          50. - 52.        7       .06
 26. - 27.        0       .00          52. - 54.        1       .01
 27. - 28.        0       .00          54. - 56.        0       .00
 28. - 29.        0       .00          56. - 58.        0       .00
 29. - 30.        0       .00          58. - 60.        0       .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 25.78 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 4

 VAR NO        MEAN          S.D.    S.E. OF MEAN  SAMPLE      MAXIMUM       MINIMUM         RANGE
RPM   1   1373.4109      314.1174          2.7984   12600    2485.0000      255.0000     2230.0000
MV    2     12.6480        6.3536           .0566   12600      21.4500         .3960       21.0540
SPD   3     17.0577       11.9765           .1067   12600      49.4462         .0000       49.4462
TP    4      1.2402         .5280           .0047   12600       2.8300         .5800        2.2500

                                 PERCENT OF TIME                   PERCENT OF TIME
                                 THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                 LEVEL         COUNT    PERCENT    GEAR     COUNT    PERCENT

                                 CLOSED         5505      43.69       1       665      21.11
                                    WOT            0        .00       2       595      18.89
                                                                      3       768      24.38
                                                                      4       826      26.22
                                                                      5       295       9.37
                                                                      6         0        .00
                                                                      7         0        .00

PERCENT OF TIME  MV AT           PERCENT OF TIME  WS AT             PERCENT OF TIME RPM AT
LEVEL         COUNT   PERCENT    LEVEL        COUNT    PERCENT      LEVEL          COUNT    PERCENT
        <                                <                                  <
   . -  1.        7       .06        . -  2.    1778     14.11          . -  200.      0        .00
  1. -  2.      635      5.04       2. -  4.     385      3.06       200. -  400.      3        .02
  2. -  3.      671      5.33       4. -  6.     693      5.50       400. -  600.     89        .71
  3. -  4.      518      4.11       6. -  8.     589      4.67       600. -  800.    291       2.31
  4. -  5.      544      4.32       8. - 10.     533      4.23       800. - 1000.    812       6.44
  5. -  6.      619      4.91      10. - 12.     490      3.89      1000. - 1200.   2838      22.52
  6. -  7.      412      3.27      12. - 14.     667      5.29      1200. - 1400.   2915      23.13
  7. -  8.      322      2.56      14. - 16.     824      6.54      1400. - 1600.   2747      21.80
  8. -  9.      327      2.60      16. - 18.     796      6.32      1600. - 1800.   1719      13.64
  9. - 10.      395      3.13      18. - 20.     704      5.59      1800. - 2000.    902       7.16
 10. - 11.      413      3.28      20. - 22.     743      5.90      2000. - 2200.    201       1.60
 11. - 12.      384      3.05      22. - 24.     928      7.37      2200. - 2400.     63        .50
 12. - 13.      344      2.73      24. - 26.     998      7.92      2400. - 2600.     20        .16
 13. - 14.      499      3.96      26. - 28.     711      5.64      2600. - 2800.      0        .00
 14. - 15.      492      3.90      28. - 30.     306      2.43      2800. - 3000.      0        .00
 15. - 16.      668      5.30      30. - 32.     100       .79      3000. - 3200.      0        .00
 16. - 17.      718      5.70      32. - 34.      74       .59      3200. - 3400.      0        .00
 17. - 18.      738      5.86      34. - 36.      93       .74      3400. - 3600.      0        .00
 18. - 19.     1106      8.78      36. - 38.     142      1.13      3600. - 3800.      0        .00
 19. - 20.     2351     18.66      38. - 40.     239      1.90      3800. - 4000.      0        .00
 20. - 21.      406      3.22      40. - 42.     333      2.64      4000. - 4200.      0        .00
 21. - 22.       31       .25      42. - 44.     288      2.29      4200. - 4400.      0        .00
 22. - 23.        0       .00      44. - 46.     137      1.09      4400. - 4600.      0        .00
 23. - 24.        0       .00      46. - 48.      46       .37      4600. - 4800.      0        .00
 24. - 25.        0       .00      48. - 50.       3       .02      4800. - 5000.      0        .00
 25. - 26.        0       .00      50. - 52.       0       .00
 26. - 27.        0       .00      52. - 54.       0       .00
 27. - 28.        0       .00      54. - 56.       0       .00
 28. - 29.        0       .00      56. - 58.       0       .00
 29. - 30.        0       .00      58. - 60.       0       .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 24.80 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 6

 VAR NO        MEAN         S.D.    S.E. OF MEAN  SAMPLE        MAXIMUM      MINIMUM       RANGE
RPM   1    1175.8149     439.5089         3.9857  12160       2325.0000     275.0000   2050.0000
MV    2      12.6708       7.4131          .0672  12160         23.1660        .4620     22.7040
SPD   3      17.7550      12.5567          .1139  12160         52.3799        .0000     52.3799
TP    4       1.2528        .7003          .0064  12160          2.8400        .4300      2.4100

                                       PERCENT OF TIME                PERCENT OF TIME
                                      THROTTLE POSITION AT           GEAR SHIFT POSITION AT
                                      LEVEL        COUNT   PERCENT   GEAR     COUNT   PERCENT


                                      CLOSED        5688     46.78      1       821     27.01
                                         WOT           0       .00      2       133      4.37
                                                                        3       799     26.28
                                                                        4       983     32.34
                                                                        5       304     10.00
                                                                        6         0       .00
                                                                        7         0       .00

 PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
 LEVEL         COUNT   PERCENT       LEVEL         COUNT   PERCENT         LEVEL            COUNT   PERCENT
        <                                   <                                     <
   . -  1.       338      2.78          . -  2.     1820     14.97             . -  200.        0       .00
  1. -  2.      1081      8.89         2. -  4.      526      4.33          200. -  400.       38       .31
  2. -  3.       726      5.97         4. -  6.      527      4.33          400. -  600.     2019     16.60
  3. -  4.       442      3.63         6. -  8.      533      4.38          600. -  800.      777      6.39
  4. -  5.       396      3.26         8. - 10.      465      3.82          800. - 1000.     1045      8.59
  5. -  6.       389      3.20        10. - 12.      366      3.01         1000. - 1200.     2425     19.94
  6. -  7.       402      3.31        12. - 14.      490      4.03         1200. - 1400.     1906     15.67
  7. -  8.       331      2.72        14. - 16.      519      4.27         1400. - 1600.     1498     12.32
  8. -  9.       302      2.48        16. - 18.      610      5.02         1600. - 1800.     1460     12.01
  9. - 10.       221      1.82        18. - 20.      711      5.85         1800. - 2000.      837      6.88
 10. - 11.       243      2.00        20. - 22.      870      7.15         2000. - 2200.      146      1.20
 11. - 12.       303      2.49        22. - 24.      845      6.95         2200. - 2400.        9       .07
 12. - 13.       334      2.75        24. - 26.      941      7.74         2400. - 2600.        0       .00
 13. - 14.       346      2.85        26. - 28.      891      7.33         2600. - 2800.        0       .00
 14. - 15.       330      2.71        28. - 30.      493      4.05         2600. - 3000.        0       .00
 15. - 16.       281      2.31        30. - 32.      210      1.73         3000. - 3200.        0       .00
 16. - 17.       301      2.48        32. - 34.       93       .76         3200. - 3400.        0       .00
 17. - 18.      1708     14.05        34. - 36.       46       .38         3400. - 3600.        0       .00
 18. - 19.       723      5.95        36. - 38.       80       .66         3600. - 3800.        0       .00
 19. - 20.       449      3.69        38. - 40.      209      1.72         3800. - 4000.        0       .00
 20. - 21.       567      4.66        40. - 42.      309      2.54         4000. - 4200.        0       .00
 21. - 22.      1256     10.33        42. - 44.      297      2.44         4200. - 4400.        0       .00
 22. - 23.       679      5.58        44. - 46.      171      1.41         4400. - 4600.        0       .00
 23. - 24.        12       .10        46. - 48.       84       .69         4600. - 4800.        0       .00
 24. - 25.         0       .00        48. - 50.       38       .31         4800. - 5000.        0       .00
 25. - 26.         0       .00        50. - 52.       15       .12
 26. - 27.         0       .00        52. - 54.        1       .01
 27. - 28.         0       .00        54. - 56.        0       .00
 28. - 29.         0       .00        56. - 58.        0       .00
 29. - 30.         0       .00        58. - 60.        0       .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 22.18 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 7

 VAR NO       MEAN        S.D.   S.F. OF MEAN  SAMPLE       MAXIMUM      MINIMUM       RANGE
RPM   1   1386.5745   518.8212       4.9649   10920     2530.0000     430.0000   2100.0000
MV    2     13.0918     6.7088        .0642   10920       23.1330        .6930     22.4400
SPD   3     19.6008    13.3383        .1276   10920       53.2333        .0000     53.2333
TP    4      1.2711      .6656        .0064   10920        3.1100        .4600      2.6500

                                    PERCENT OF TIME                  PERCENT OF TIME
                                   THROTTLE POSITION AT              GEAR SHIFT POSITION AT
                                   LEVEL        COUNT   PERCENT      GEAR     COUNT   PERCENT

                                   CLOSED        4177     38.25        1        551     20.18
                                      WOT          16       .15        2        169      6.19
                                                                       3        786     28.79
                                                                       4        551     20.18
                                                                       5        559     20.48
                                                                       6        111      4.07
                                                                       7          3       .11

 PERCENT OF TIME  MV AT                   PERCENT OF TIME  WS AT                PERCENT OF TIME RPM AT
 LEVEL           COUNT   PERCENT          LEVEL          COUNT   PERCENT        LEVEL             COUNT   PERCENT
        <                                        <                                         <
   . -  1.         260      2.38             . -  2.       1422     13.02            . -  200.        0       .00
  1. -  2.         304      2.78            2. -  4.        350      3.21         200. -  400.        0       .00
  2. -  3.         377      3.45            4. -  6.        386      3.53         400. -  600.     1390     12.73
  3. -  4.         699      6.40            6. -  8.        458      4.19         600. -  800.      826      7.56
  4. -  5.         399      3.65            8. - 10.        308      2.82         800. - 1000.      541      4.95
  5. -  6.         332      3.04           10. - 12.        352      3.22        1000. - 1200.      698      6.39
  6. -  7.         456      4.18           12. - 14.        456      4.18        1200. - 1400.     1532     14.03
  7. -  8.         209      1.91           14. - 16.        575      5.27        1400. - 1600.     1910     17.49
  8. -  9.         271      2.48           16. - 18.        494      4.52        1600. - 1800.     1311     12.01
  9. - 10.         282      2.58           18. - 20.        551      5.05        1800. - 2000.     1291     11.82
 10. - 11.         334      3.06           20. - 22.        718      6.58        2000. - 2200.     1024      9.38
 11. - 12.         587      5.38           22. - 24.        931      8.53        2200. - 2400.      307      2.81
 12. - 13.         405      3.71           24. - 26.        811      7.43        2400. - 2600.       90       .82
 13. - 14.         478      4.38           26. - 28.        664      6.08        2600. - 2800.        0       .00
 14. - 15.         432      3.96           28. - 30.        537      4.92        2800. - 3000.        0       .00
 15. - 16.         326      2.99           30. - 32.        406      3.72        3000. - 3200.        0       .00
 16. - 17.         491      4.50           32. - 34.        261      2.39        3200. - 3400.        0       .00
 17. - 18.        1311     12.01           34. - 36.        122      1.12        3400. - 3600.        0       .00
 18. - 19.         606      5.55           36. - 38.         47       .43        3600. - 3800.        0       .00
 19. - 20.         511      4.68           38. - 40.         37       .34        3800. - 4000.        0       .00
 20. - 21.         277      2.54           40. - 42.         62       .57        4000. - 4200.        0       .00
 21. - 22.         656      6.01           42. - 44.        109      1.00        4200. - 4400.        0       .00
 22. - 23.         849      7.77           44. - 46.        201      1.84        4400. - 4600.        0       .00
 23. - 24.          68       .62           46. - 48.        243      2.23        4600. - 4800.        0       .00
 24. - 25.           0       .00           48. - 50.        253      2.32        4600. - 5000.        0       .00
 25. - 26.           0       .00           50. - 52.        124      1.14
 26. - 27.           0       .00           52. - 54.         42       .38
 27. - 28.           0       .00           54. - 56.          0       .00
 28. - 29.           0       .00           56. - 58.          0       .00
 29. - 30.           0       .00           58. - 60.          0       .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 23.53 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 8

 VAR NO       MEAN        S.D.   S.E. OF MEAN  SAMPLE       MAXIMUM     MINIMUM      RANGE
RPM   1  1366.0732    510.1714        4.7368  11600      2520.0000    370.0000  2150.0000
MV    2    13.4993      6.6153         .0614  11600        22.9680       .7590    22.2090
SPO   3    18.5745     12.9746         .1205  11600        53.2867       .0000    53.2867
TP    4     1.2363       .6678         .0062  11600         3.0800       .4300     2.6500

                                 PERCENT OF TIME                  PERCENT OF TIME
                                 THROTTLE POSITION AT             GEAR SHIFT POSITION AT
                                 LEVEL        COUNT   PERCENT     GEAR    COUNT   PERCENT

                                 CLOSED        5026     43.33
                                    WOT           7       .06        1      616     21.24
                                                                     2      246      8.48
                                                                     3      603     20.79
                                                                     4      872     30.07
                                                                     5      556     19.17
                                                                     6        0       .00
                                                                     7        7       .24

PERCENT OF TIME  MV AT               PERCENT OF TIME  WS AT               PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT       LEVEL          COUNT   PERCENT       LEVEL             COUNT   PERCENT
        <                                    <                                     <
   . -  1.       324      2.79          . -  2.      1903     16.41             . -  200.       0       .00
  1. -  2.       580      5.00         2. -  4.       412      3.55          200. -  400.       1       .01
  2. -  3.       309      2.66         4. -  6.       211      1.82          400. -  600.    1520     13.10
  3. -  4.       185      1.59         6. -  8.       322      2.78          600. -  800.     835      7.20
  4. -  5.       140      1.21         8. - 10.       342      2.95          800. - 1000.     469      4.04
  5. -  6.       304      2.62        10. - 12.       296      2.55         1000. - 1200.     994      8.57
  6. -  7.       474      4.09        12. - 14.       562      4.84         1200. - 1400.    1993     17.18
  7. -  8.       457      3.94        14. - 16.       620      5.34         1400. - 1600.    1458     12.57
  8. -  9.       518      4.47        16. - 18.       780      6.72         1600. - 1800.    1781     15.35
  9. - 10.       540      4.66        18. - 20.       690      5.95         1800. - 2000.    1425     12.28
 10. - 11.       497      4.28        20. - 22.       857      7.39         2000. - 2200.     681      5.87
 11. - 12.       426      3.67        22. - 24.       923      7.96         2200. - 2400.     380      3.28
 12. - 13.       446      3.84        24. - 26.       620      5.34         2400. - 2600.      63       .54
 13. - 14.       395      3.41        26. - 28.       720      6.21         2600. - 2800.       0       .00
 14. - 15.       327      2.82        28. - 30.       661      5.70         2800. - 3000.       0       .00
 15. - 16.       327      2.82        30. - 32.       304      2.62         3000. - 3200.       0       .00
 16. - 17.       254      2.19        32. - 34.       144      1.24         3200. - 3400.       0       .00
 17. - 18.      1580     13.62        34. - 36.        95       .82         3400. - 3600.       0       .00
 18. - 19.       719      6.20        36. - 38.       100       .86         3600. - 3800.       0       .00
 19. - 20.       608      5.24        38. - 40.        87       .75         3800. - 4000.       0       .00
 20. - 21.       418      3.60        40. - 42.       101       .87         4000. - 4200.       0       .00
 21. - 22.       915      7.89        42. - 44.       181      1.56         4200. - 4400.       0       .00
 22. - 23.       857      7.39        44. - 46.       248      2.14         4400. - 4600.       0       .00
 23. - 24.         0       .00        46. - 48.       205      1.77         4600. - 4800.       0       .00
 24. - 25.         0       .00        48. - 50.       150      1.29         4800. - 5000.       0       .00
 25. - 26.         0       .00        50. - 52.        56       .48
 26. - 27.         0       .00        52. - 54.        10       .09
 27. - 28.         0       .00        54. - 56.         0       .00
 28. - 29.         0       .00        56. - 58.         0       .00
 29. - 30.         0       .00        58. - 60.         0       .00
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1969 FORD TRACTOR WITH 391 CID V-8, 43500 LB GCW, TEST WT. 28900 LB. TRUCK G-10
RUN DURATION 21.33 MIN. IDLE SPEED 600 RPM, 10/16/74 RUN 9

 VAR NO        MEAN        S.D.   S.E. OF MEAN  SAMPLE     MAXIMUM     MINIMUM       RANGE
RPM   1   1357.5991    451.4603         4.4016   10520   2620.0000    200.0000   2420.0000
MV    2     12.9566      6.8973          .0672   10520     23.0010       .7920     22.2090
SPD   3     20.4774     11.1322          .1085   10520     53.2333       .0000     53.2333
TP    4      1.2938       .7072          .0069   10520      3.1400       .4700      2.6700

                                    PERCENT OF TIME                 PERCENT OF TIME
                                    THROTTLE POSITION AT            GEAR SHIFT POSITION AT
                                    LEVEL       COUNT   PERCENT     GEAR     COUNT   PERCENT


                                    CLOSED       4391     41.74        1       307     11.67
                                       WOT         39       .37        2       240      9.13
                                                                       3       325     12.36
                                                                       4      1238     47.07
                                                                       5       519     19.73
                                                                       6         0       .00
                                                                       7         1       .04

PERCENT OF TIME  MV AT              PERCENT OF TIME  WS AT              PERCENT OF TIME RPM AT
LEVEL          COUNT   PERCENT      LEVEL          COUNT   PERCENT      LEVEL            COUNT   PERCENT
      <                                   <                                     <
  . -  1.       507       4.82        . -  2.       786       7.47          . -  200.         0        .00
 1. -  2.       664       6.31       2. -  4.       402       3.82       200. -  400.        25        .24
 2. -  3.        82        .78       4. -  6.       190       1.81       400. -  600.       476       4.52
 3. -  4.       132       1.25       6. -  8.       224       2.13       600. -  800.      1024       9.73
 4. -  5.       179       1.70       8. - 10.       179       1.70       800. - 1000.       916       8.71
 5. -  6.       411       3.91      10. - 12.       342       3.25      1000. - 1200.      1439      13.68
 6. -  7.       477       4.53      12. - 14.       561       5.33      1200. - 1400.      1460      13.88
 7. -  8.       386       3.67      14. - 16.       596       5.67      1400. - 1600.      2015      19.15
 8. -  9.       477       4.53      16. - 18.       688       6.54      1600. - 1800.      1092      10.38
 9. - 10.       436       4.14      18. - 20.       646       6.14      1800. - 2000.      1260      11.98
10. - 11.       606       5.76      20. - 22.       888       8.44      2000. - 2200.       566       5.38
11. - 12.       496       4.71      22. - 24.      1198      11.39      2200. - 2400.       185       1.76
12. - 13.       283       2.69      24. - 26.      1085      10.31      2400. - 2600.        60        .57
13. - 14.       397       3.77      26. - 28.       770       7.32      2600. - 2800.         2        .02
14. - 15.       406       3.86      28. - 30.       525       4.99      2800. - 3000.         0        .00
15. - 16.       325       3.09      30. - 32.       297       2.82      3000. - 3200.         0        .00
16. - 17.       211       2.01      32. - 34.       170       1.62      3200. - 3400.         0        .00
17. - 18.       580       5.51      34. - 36.       103        .98      3400. - 3600.         0        .00
18. - 19.       616       5.86      36. - 38.        65        .62      3600. - 3800.         0        .00
19. - 20.       652       6.20      38. - 40.        59        .56      3800. - 4000.         0        .00
20. - 21.       552       5.25      40. - 42.       138       1.31      4000. - 4200.         0        .00
21. - 22.       953       9.06      42. - 44.       195       1.85      4200. - 4400.         0        .00
22. - 23.       686       6.52      44.   46.       165       1.57      4400. - 4600.         0        .00
23. - 24.         6        .06      46. - 48.       142       1.35      4600. - 4800.         0        .00
24. - 25.         0        .00      48. - 50.        71        .67      4800. - 5000.         0        .00
25. - 26.         0        .00      50. - 52.        29        .28
26. - 27.         0        .00      52. - 54.         6        .06
27. - 28.         0        .00      54. - 56.         0        .00
28. - 29.         0        .00      56. - 58.         0        .00
29. - 30.         0        .00      58. - 60.         0        .00
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